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THE MODERN DECLINE OF BREAST-FEEDING *

BY

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Prosperity and social comfort have not encouraged maternal breast-feeding of the human infant. There can have been few women of fashion in the eighteenth century who did not hire a wet nurse to succour and suckle their babies. At that time the wet nurse was the mother-substitute, and failing a wet nurse the mother must feed her own infant or it would die. Now we have changed all that. Since then we have learnt how to feed babies on cow's milk in a simple and relatively safe manner. We have invented the feeding-bottle and the rubber teat. Chemists have shown us the composition of milk, and commerce has made it available for all. We can have it fresh, dried, or condensed. We know how much to give and how to give it in order to promote an infant's growth. So the cow is now the mother-substitute, and in this country there is no mother who cannot obtain this substitute if she so desires it. It is therefore an appropriate moment to ask ourselves to what extent there is a decline in maternal breast-feeding, and to inquire into the cause and effects of this decline. If it be found that a considerable proportion of women are gestating and bearing children but are cutting short this reproductive cycle by failing to lactate, it is surely both a matter of biological or clinical importance and a social experiment of great scientific interest.

The clinical importance of breast-feeding has always been recognized by paediatricians; but here again it is an appropriate moment to remind ourselves of this fact, for the infant mortality in this country remains twice as high as that in many other countries, and in some of our industrial towns it remains three times as high as it is, for example, in towns of similar size in Australia. Moreover, in some of our towns it has been slowly rising in recent years in spite of an increase in public expenditure on child welfare. This means that of the 40,000 deaths of infants each year in this country 20,000 might be prevented, or, to bring it nearer home, of the 500 infant deaths which take place each year in some of our industrial towns at least 300 could be prevented. The Edwardian question, "If preventable, why not prevented?" should be sufficient to keep alive our clinical interest in this important subject. That it is important can be recognized by comparing it with the clinical and social significance of a disease like pernicious anaemia. There can be no more than 7,000 or 8,000 people with pernicious anaemia in this country, yet the scientific and clinical interest involved in treatment of these old people is out of all proportion to that devoted to the prevention of the 20,000 preventable infant deaths each year.

It may be said that I am pushing an open door, that it is well recognized that an encouragement of breast-feeding is one of the methods of combating the excessive infant mortality. But there are many who do not recognize it. Let me quote a medical officer of health of one of the large towns who has recently written in his annual report: "I have reached the stage when I question very much if there is any material advantage in keeping an infant on the breast. Further, I believe that fewer dietetic troubles occur in the artificially fed babies, because there is less likelihood of overfeeding and irregular feeding and there is greater control of the diet. I have not seen any recent evidence to suggest that the artificially fed child is more prone to disease or more likely to succumb to disease than his naturally fed brother, neither do I think that he is responsible for the large number of rejects found amongst recruits to the national services. Finally, so far as the mother herself is concerned, I think it is to her advantage that she should not feed her child. The whole action of feeding acts as a drain on her resources and curtails her activities over a long period, and certainly does not encourage her to increase the number of her family." There can be no doubt that statements like this encourage the use of cow's milk at the expense of breast-feeding and that they represent a view which is spreading in some sections of the community.

The Incidence of Breast-feeding

Accurate information about the incidence of breast-feeding is difficult to find, and is still more difficult to compare on account of the difference in the methods of enumeration used. We desire to know what proportion of babies in various countries or in different social groups are breast-fed or artificially fed from birth. We desire to know also at what age weaning takes place. It is this precise information that is lacking. Some observers record their results by estimating the average duration of breast-feeding, others the proportion who are entirely breast-fed for six months or nine months. But there is no commonly adopted system of collecting statistics which tells accurately when women wean their babies. From maternity hospitals we can obtain accurate information about the feeding of infants in the first few weeks of life. This in itself is valuable, for in this neo-natal stage proper

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nutrition and protection from inimical influences are more important than at any other age. Moreover, since a large proportion of babies are weaned shortly after this neo-natal stage the incidence of breast-feeding at this time tells a good deal about the trend of events.

In Newcastle Dr. Frank Stabler has made careful statistical studies of the clinical material in the Princess Mary Maternity Hospital in recent years. He has supplied me with the following figures, which represent the percentage of those infants leaving hospital at about the end of the second week of the puerperium who are wholly breast-fed:

1933 (1,431 infants) ..	87.8%	1935 (1,436 infants) ..	80.9%
1934 (1,460 „) ..	84.3%	1936 (1,346 „) ..	74.6%

These figures from a city maternity hospital do not perhaps give a fair example of the people, so I have collected information from a private nursing home for middle-class patients and have excluded all patients with obstetrical difficulties or physically defective children. The matron is a sagacious woman with a strong personality who encourages breast-feeding whole-heartedly. Between 1934 and April, 1938, there were 1,046 normal deliveries, and of these 76.8 per cent. of the infants left the home wholly breast-fed, 19.6 per cent. partially breast-fed, and 3.6 per cent. wholly bottle-fed. The majority of infants who are only partially breast-fed in hospitals are shortly weaned, so it is plainly to be seen that in this town satisfactory breast-feeding in the neo-natal period is maintained by only three-quarters of the mothers, and that there has been a significant decline in the incidence of breast-feeding in recent years. In Edinburgh Dr. T. Y. Finlay has made a careful estimate of the incidence of breast-feeding by visits to the homes of three sample groups totalling 3,000 mothers, and has allowed me to use his results. The sample groups agree closely, and show that at the tenth to fourteenth day 87 per cent. of the mothers are wholly breast-feeding their infants.

There is an immediate decline in the incidence of breast-feeding when the mother resumes domestic and social duties. Dr. George Brewis has collected statistics of 1,326 infants who attended the municipal welfare centres in Newcastle in March, 1938. Of these, 58.4 per cent. were wholly breast-fed at three months and 34.7 per cent. at 6 months. In Edinburgh, of the 3,000 mothers visited between the third and sixth months 55 per cent. were continuing to wholly breast-feed their infants and 38.5 per cent. when visited after the sixth month. In both towns the child welfare services give ardent encouragement to the mothers to breast-feed their infants, so the results may be regarded on the high-water mark of achievement in big towns under prevailing conditions. A similar state of affairs obtains in other towns and other countries. In a South Lancashire centre in 1933 Wilson found that 50 per cent. of the infants were weaned at the third month. In an American village Bisal found that only 31 per cent. were breast-fed for three months. In Scandinavia two investigations have shown that 32 to 40 per cent. were breast-fed for six months. In Riga only 19 per cent. were wholly breast-fed for six months. In America conditions vary greatly. One observer writes, "My conclusions show that breast-feeding exclusively for the newborn is about extinct in Brooklyn amongst the middle-class mothers." Yet in Chicago of 20,061 infants under the care of the welfare service from 1924 to 1929, 48.5 per cent. were entirely breast-fed for nine months.

For our argument it is safe to assume that, apart from the little milk that may be yielded in the first few days, 20 to 30 per cent. of babies are artificially fed from birth in many if not most of our big towns, and that not more than a third of the mothers of these towns are fully feeding their babies until the sixth month. My experience is that bottle-feeding is a habit which readily spreads. If one woman in a maternity ward resorts to bottle-feeding others immediately begin to find difficulties in their own ability to breast-feed. So under prevailing conditions we can presume that a further decline in the incidence of breast-feeding will take place.

Influence of Feeding on the Infant's Health

The medical officer of health whom I have quoted is not alone in questioning the superiority of breast-feeding over artificial feeding in maintaining the health of the infant, and the belief has spread to other quarters. Modern advertisements and other agencies have persuaded large numbers of women that artificial feeding is entirely safe and satisfactory for their infants and not disadvantageous to themselves. The mother-and-child subject favoured by the mediaeval painters has been replaced by the baby-and-bottle subject or the studio milkmaid subject of the modern photographic poster.

It is possible that hospital physicians seeing so much of sick infants are apt to exaggerate the dangers of artificial feeding. But, having taken that into account, it is beyond all question that breast-fed infants show a greater freedom from disease and a greater power of recovery from disease than artificially fed infants. The results in pyloric stenosis give straightforward evidence about this. In the Newcastle Babies' Hospital the mortality in 114 breast-fed infants with pyloric stenosis has been 5 per cent., but in 133 bottle-fed infants it has been 30 per cent. But the most complete evidence is to be obtained from the studies of Grulee and Sanford in Chicago. They investigated the morbidity rates and mortality rates in 20,000 infants. Including every minor disturbance of health, the morbidity rate in the breast-fed group was 37 per cent., in the partially breast-fed group 53 per cent., and in the artificially fed group 63 per cent. The mortality rates were still more striking. Of their 9,749 breast-fed infants only fifteen died, of 8,605 partially breast-fed fifty-nine died, and of 1,707 artificially fed infants 144 died. These figures are significant enough to require no elaboration. But apart from the immediate significance of high morbidity rates and high mortality rates in artificially fed infants, there may be remote ill effects which have not yet been recognized or defined. It is possible that some of the serious degenerative diseases of adult life have their origin in the artificial feeding of infancy. I know of no investigation of this problem which has been scientifically carried out to disprove this, and we may recognize that such remote results are within the bounds of possibility when we recall the wonderful clinical observations of Nye, that temporary exposure of children to the paint dust on veranda floors of wooden shacks produced arteriosclerosis and chronic nephritis thirty and forty years afterwards.

Breast-feeding and the Mother

There are difficulties in approaching this question of the effects of breast-feeding on the mother herself. Apart from the observation that repeated lactation in malnourished women may produce anaemia, there is very little scientific information on this subject. It might be suspected that women who have cut short the reproductive cycle by failing to lactate would be prone later to develop endocrine disorders. The pathological obesities which sometimes follow pregnancy suggest that a mismanage-

ment of lactation may be an example of this. In the absence of scientific information opinions appear to be based largely on sentiment.

Much more is known about cows. Out of a common pedigree stock of shorthorn cows the breeders by selection have produced in thirty years two distinct strains—the dairy shorthorn and the beef shorthorn. Intensive breeding of these strains has resulted in a remarkable difference in their milking capacity. The dairy strain of shorthorn is capable of yielding five to six gallons of milk a day. The beef strain is capable of yielding less than two gallons of milk a day. So far has this gone that there is a danger that the beef-strain shorthorn will become incapable of yielding enough milk for her own calves. Selective breeding from human beings who hold the view that breast-feeding is no longer necessary may have remote biological effects we do not foresee.

The effects of lactation on the mother's character, temperament, and mental outlook deserve equal consideration with the physical or biological effects. This aspect has received very little study. Modern novelists, eager as they are to explain every conscious and subconscious gesture of their subjects, have hardly touched the theme. Havelock Ellis in his *Psychology of Sex* gives it relatively little notice. Yet the puerperal period is characterized by most interesting and distinctive psychological reactions. The desire for a mother to be left alone to sleep immediately after parturition has both a physical and a psychological value. And afterwards her peculiar jealousies and her craving for individual attention both suggest that she needs a special environment, for psychological as well as physical reasons. Again, if one is to judge by the look of lascivious content that comes over some women's faces as they feed their infants there must be a sense of achievement in the act which has a definite value in maintaining their mental health. These mental states and emotional states of the lying-in woman deserve careful elucidation. Most of those whose profession it is to research or to write are debarred either by their sex or by their sterility from judging aright in this matter. But there are some who are equipped by experience and insight to undertake this work, and I would suggest that they should elucidate these problems for us. For my part I can say only that in most cases I can recognize a woman who has successfully breast-fed an infant, and that I find her to be a saner and a more sensible woman than her sister who has failed to do so.

The Physiology of Lactation

If we are to discuss the causes of failure in breast-feeding it will be well to consider first the mechanism of lactation. New knowledge of the ovarian hormones and the pituitary hormones has filled many gaps in our understanding of this. During pregnancy the ovarian hormones develop and increase the breast tissue and the nipples, which in this way are prepared for lactation. Immediately after parturition the ovarian hormones which inhibit lactation recede, and a pituitary hormone, "prolactin," then comes into play and establishes lactation. Later lactation is maintained by this pituitary hormone secreted under nervous reflex influences. There are at least two of these reflex influences. The first is the frequent emptying of the breast by suckling; the second is a nervous influence engendered in the emotional state of the mother and probably acting through the hypothalamus. Fear, doubt, anxiety, and lack of interest are states of mind which inhibit lactation. I have known a woman to be secreting daily thirty-five to forty ounces of milk for her infant and yet the yield has fallen suddenly to three or four ounces a day under the influence of a dispute with the father of the infant. In my experience it is emotional disturbances in which the father is concerned that have the greatest inhibiting effect, but over-anxiety about her own ability to feed her infant is almost as harmful. The behaviour of the father during and shortly after the mother's parturition, although often a subject for ridicule, is significant enough to suggest a remnant of some remote biological purpose, and as such it has been studied by the anthropologists. For our purpose it is sufficient to say that in the early stages of lactation he should remain an admiring and protective figure in the background, while his wife receives the ministrations and exhortations of a sagacious and experienced woman.

Studies of mothers' behaviour after parturition indicate that it alters in three distinct stages, each of them with a bearing on lactation. The first stage is one of profound rest and relaxation both for mother and child which may last for twenty-four to forty-eight hours. The child should not need milk or other fluid in that stage, and the mother should be free from meddlesome interference. It is one of the most miraculous of physiological arrangements that lactation is delayed in that early period and afterwards is suddenly established simultaneously with the awakening child's desire for food. The second stage is the establishment of lactation. This may take five or six days, and corresponds to the physiological lying-in period. In this stage the mother will require the help of the modern equivalent of the experienced and sagacious woman. Between these two the establishment of lactation should be a co-operative function, with the mother being allowed to fondle her child as often as she wishes, and without any fixed rules about four-hourly or three-hourly intervals. Another feature of this stage is that the mother requires to be segregated and free from distractions. She should, if possible, be in her own room, concerning herself only with the joys and duties of recovering from her labour and launching her infant on its new mode of existence. Studies of the peculiar jealousy reactions of lying-in women indicate the physiological need for this segregation. If in a surgical ward there are twelve women who have recently had operations for appendicitis we observe no jealousy and no unusual behaviour when a nurse gives particular attention to one of their number, but if there are twelve women in a maternity ward, all recently delivered, and a nurse has to give particular attention to one of them, there is immediately an atmosphere of jealousy which shows itself in demands for bed-pans and for other forms of individual attention. The third stage follows the lying-in period and begins when the mother, now out of bed, takes the feeding and care of her infant into her own hands. In these days its commencement, for many women, corresponds with the day of their discharge from a maternity hospital, abruptly to shoulder the double task of tending to their infants and their homes. Too often the significance of these stages and the need for the mother to pass successfully from one to another is overlooked. Particularly in maternity homes and by maternity nurses are they overlooked. For ten or fourteen days the mother follows the ritual of a hospital bed-patient with her infant presented to her at the ordained intervals, and then on the next day full responsibility is suddenly transferred to her.

There are wide variations in the time and rate at which lactation is established. This is well recognized, but it is not sufficiently understood that lactation may have been prevented for several weeks and yet be re-established. I have seen it re-established eleven weeks after parturition

in a woman who has resorted to bottle-feeding her infant, and who had not previously secreted any breast milk either by suckling or by manual expression.

There is a good deal of misunderstanding concerning the chemical composition of human milk. Fantastic theories of infant feeding have been built on the supposition that it is a food containing fixed and optimal quantities of protein, fat, and sugar. Far from being fixed, there is considerable variation in its composition from one feed to another. The fat content of human milk is commonly 3 per cent. at the first feed of the day, 6 per cent. at the second feed, and between 4 and 5 per cent. at the later feeds. The protein and sugar contents vary also, but to a lesser degree. Even the volume of feeds fluctuates widely under natural conditions. A healthy baby may require and take six ounces at one feed and be satisfied with three ounces at the next. I wish to emphasize these facts, for I shall refer to them again when dealing with the causes of failure in breast-feeding.

Concerning the normal mechanism of lactation there remains one other question. What percentage of women are incapable of breast-feeding because of physical abnormalities? Less than one cow in a thousand fails to lactate. Is the greater number of women who fail due to inherent structural faults or to environmental causes? In many rural districts in this country at least 95 per cent. of women successfully establish their lactation. There is no reason to think that with proper management the proportion of urban women capable of doing this is less than it is among the rural women. An endocrine mechanism which has allowed a woman to conceive and give birth does not at that stage fail to provide for lactation. There remain a few, less than five per cent., in whom it is physically impossible to establish lactation either because of diseased or malformed nipples, or because the infant cannot suck on account of mental defect or of cleft palate or other physical fault. All women who are not handicapped by these physical defects can breast-feed their infants if they desire to do so and if they are not prevented by an unsuitable environment.

The Failure of Lactation

There are those who cannot, those who will not, and those who know not how to breast-feed their infants.

Those who cannot I have already mentioned. They are a small group with physical faults in themselves or in their infants. Those who will not breast-feed their infants I shall not discuss, except to say that often the fault lies not in themselves but in those who advise them. It is due as much to ignorance as to selfishness. It is fostered by a belief that bottle-feeding is adequate and breast-feeding no longer necessary. Modern methods of advertisement are responsible, but the fault lies also in the readiness to receive advice and the desire which lurks in everyone to give advice about health and to appear possessed of occult secrets when giving it. The medical profession itself is not free from the influences of advertisement. No doctor receives a blotter once a week advertising breast milk. Too often do we hear of advice being given from within the profession that an infant must be weaned because the breast milk is not agreeing with it—advice portentously linked with a recommendation of a special brand of infant food, suggesting again the possession of a secret knowledge of the biochemical advantages of that brand of cow's milk over human milk for an infant who later may be found to be suffering from pyloric stenosis. More recently another kind of belief has arisen which encourages the weaning of babies. It is a belief that has grown out of the publicity about malnutrition and extra nourishment. It was illustrated for me by a young wife living on a completely adequate diet, who told me that she could not breast-feed her infant because she was not receiving "extra nourishment" from a welfare centre. For this reason she had weaned her baby. The need for adequate nourishment of nursing mothers is obviously important, but here was a woman, typical of many in this country, muddle-headed by what she had read. In its effects this ignorance is the same as the selfishness of the young wife who will not feed her infant and explains it by saying that her husband wishes her to go about with him and does not like her to breast-feed—the wife who sacrifices the role of mother to that of mate.

It is those who know not how to breast-feed and fail in spite of their desire to do so who deserve our close consideration in this discussion. This failure ordinarily takes place chiefly in two stages. The first is in the lying-in period, through difficulties in establishing lactation. The second is shortly after the lying-in period, through difficulties in maintaining lactation.

I believe the chief cause of failure in establishing lactation is due to mismanagement. To explain this I can do no better than quote from a letter from Dr. Clifford Grulee: "My personal opinion is that all this talk of the modern woman being unable to nurse her baby is due very largely to the modern nurse's tendency to poke a bottle of milk in the baby's mouth, which of course is due to the indifference of the physician." He goes on to describe that in one of his hospitals they have two services for the newborn. In one, the out-patient service, 95 per cent. of the babies were being breast-fed at the end of the lying-in period. In the other, an in-patient department, less than 50 per cent. were breast-fed. They have been able to raise this to almost 90 per cent. simply by refusing to give the child a bottle in the first week of life. If fluid is required a little is given from time to time from a medicine-dropper. The attitude of the nurse at this stage is of supreme importance. I know of one maternity nurse who, after having been in practice for fifteen years, came to a household in which she was first enthused about breast-feeding and then instructed in overcoming the difficulties of establishing it. Prior to that more than half her babies had been bottle-fed. When seen a few years afterwards she proudly proclaimed that since her sojourn in that house she had never failed to establish breast-feeding. The essence of the faults in most hospitals and nursing homes is that they attempt too much to mechanize breast-feeding. They have institutional rules about the times of feeds, the amount of feeds, the weighing of babies, and the test weighing of feeds, to which they try to fit the patient. If this is not successful anxiety is aroused, and immediately the difficulty of establishing lactation is increased. I heard recently of a woman troubled much by insomnia throughout her pregnancy, who was delivered of her child in the early hours of the morning and then fell into a satisfactory post-partum sleep, to be awakened at seven o'clock to have her teeth brushed. The lying-in room is becoming too much a combination of a sick-room and a flower-decked reception-room. After lactation has started the mother should be allowed to fondle her child as often as possible. There should be no test-weighing of the feeds and no temperature-taking of the infant unless clinical observation indicates the need for it. And there should be no feeding of a healthy newborn baby with a bottle until the first week at least has passed and it is proved that the breast

milk is inadequate. Finally, in houses and hospitals each mother should have her own room. If this can be afforded for the inmates of prisons it should be possible to afford it for the mother of babies. In her own room she would be free not only from the contagion of bacterial disease but also the contagion of desire to bottle-feed which at times spreads from mother to mother in a big ward.

Probably the most important cause of failure to breast-feed among those who desire to do so is the temporary inhibition of lactation which occurs shortly after the lying-in period when the mother returns to her household duties. This is interpreted as a final disappearance of the milk, with the result that she resorts to bottle-feeding. This could be overcome to a large extent by allowing the mother to be out of bed for a few days in the hospital before returning home, and by warning her that the disappearance of the breast-milk will probably last only for a day or two and that it can be restored with perseverance. I shall quote one more example to illustrate the faults of the mechanization of breast-feeding. Some time ago I was summoned to the house of young parents to see a three-months-old infant. The father was a lecturer in science, the mother a recent graduate of a university. The bookcase in unstained oak, the bare off-white walls, and the weekly political journals denoted their type and tastes. She was an earnest woman, breast-feeding her infant and anxious to continue. The complaint was that the child had failed to gain weight for a month and was but little over its birth weight. It was much troubled by frequent green stools and restlessness. I suggested that the child had no disease, but was receiving too little nourishment. This was denied by the mother, who produced figures and charts to show that test weighing had been used for every feed since birth, and that the infant had received the exact physiological amounts of breast milk—so many ounces a day for each pound of its body weight. She quoted authorities at me to prove her point. I persuaded her to discard the test weighing and to feed the infant five or six times a day until he appeared satisfied. In ten days he gained a pound, and there was no more trouble and no more test weighing. This over-mechanization is again seen in the frequent appeal to know whether a baby should be fed at four-hourly or three-hourly intervals. I would submit that the reply to this should be that the mother should cultivate an instinctive recognition of her own baby's needs, that she should come to know when the baby is satisfied, and that she should then choose the times of feeding most suitable to herself and her child. Only in difficulties should professional advice be sought.

Conclusion

It appears that the incidence of breast-feeding is declining. The causes of this are our increasing indifference to the value of breast-feeding and a mismanagement of the mother in the early stages of lactation. The correction of the fault lies mainly in the hands of those who tend and advise the mother in and shortly after her lying-in. Big hospital wards and crowded child welfare centres do not provide an atmosphere which encourages breast-feeding. Better education of doctors and maternity nurses in the care of infants may help to correct the fault; and that the importance of this education is not sufficiently recognized is suggested by the recent authoritative order of the Ministry of Health that panel practitioners attending their refreshing postgraduate courses are not to receive instruction in diseases of infancy or childhood.

THE SPREAD OF STREPTOCOCCAL DISEASE

BY

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Studies in the epidemiology of streptococcal disease are appearing with increasing frequency, and during the past ten years certain new principles have evolved concerning the prevention of these infections. Clinical practice has, however, been slow to apply these important principles. The obstetricians, stimulated by public anxiety concerning puerperal sepsis, have made valuable contributions to these studies, and the story of their success has recently been told by Professor Miles H. Phillips (1938); but the rest of the profession would appear to lag behind both in practice and in teaching. This is unfortunate, because in some quarters the obstetrician's particular interest in puerperal sepsis has given a specialist bias to a problem of general concern. For puerperal sepsis accounts for a small part only of the total morbidity and mortality attributable to *Streptococcus pyogenes*, and it seems not improbable that the practice of obstetrics is, in fact, less affected by the droplet spread of streptococci than are the other branches of clinical medicine and surgery. From the public health point of view it matters little through which portal the streptococcus or its toxins invade the body, and it is not always realized that what is written about the prevention of puerperal fever applies also to all disease spread by droplet contagion. But since puerperal fever has established itself as the classic type of grave streptococcal disease *sine eruptione*, it might be well for us to read again Phillips's historical note and add "*et alia*" after each mention of puerperal fever; for what applies to the classic type is equally applicable to scarlet fever, erysipelas, cellulitis, most wound infections and septicaemia, the bulk of naso-pharyngeal and otic suppuration, many pneumonias and, probably, acute rheumatism and acute nephritis.

The crux of the whole matter is a paradox: an isolated case of puerperal fever is in itself evidence of an epidemic. It implies a widespread prevalence of streptococcal disease, and a slight rise in maternal mortality is paralleled by a much greater toll from other streptococcal accidents. If puerperal fever is preventable so are these other accidents, and information as to how they can be controlled is rapidly accumulating. Let us review some of the more recently established facts.

Bacteriology of Streptococcal Infections

Old nomenclatures are a hindrance. Okell's (1932) Milroy Lectures provide a good text. We are now concerned almost entirely with *Streptococcus pyogenes*, for this is the group most commonly pathogenic to man. *Str. viridans* and non-haemolytic organisms, apart from an occasional strain of *Str. pyogenes* which fails to give β haemolysis, are, except when they invade an unusual location such as a previously damaged endocardium or urinary tract, of little significance as disease producers and must be looked upon as part of the normal bacterial flora of man. The part played by anaerobic streptococci is not yet measured, but on clinical grounds it would appear to be of minor importance. The classification of haemolytic streptococci—and for our present purpose it is safe to say that we are almost entirely con-

cerned with those giving β haemolysis on horse-blood-agar plates—has been simplified by the introduction of serological typing. No longer does definition of a given organism depend on its morphological and cultural characters, which now become of academic interest only. We can forget such names as "*Streptococcus longus*," "*Str. brevis*," and "*Str. mucosus*." We can also forget *Str. epidemicus, Str. scarlatinae, Str. erysipelatis, Str. anginosus*, etc., and with them discard the "specificity" hypothesis which sought to associate a well-defined clinical entity with a particular and specific kind of organism. We now know that in any given epidemic a single strain of *Str. pyogenes* may produce angina, scarlet fever, erysipelas, cellulitis, lymphangitis, adenitis, otitis, sinusitis, meningitis, puerperal fever, septicaemia, etc. What Okell (1932) calls the "unitarian" hypothesis is now well tried, and must be accepted if we are to understand the very elements of streptococcal epidemiology.

The bulk of, but not all, haemolytic streptococci pathogenic to man are identifiable by a specific carbohydrate substance, and fall into Group A of Mrs. Lancefield (1928). This group is further subdivided into about thirty different "Griffith types" (Griffith, 1934), each characterized by a specific "M" substance upon which their identification by agglutination with absorbed sera depends. It is this typing technique which has made epidemiological studies and the proof of the unitarian hypothesis possible. A note of warning must be introduced here. These techniques are available in very few laboratories, and it is at present unfair to expect the majority of bacteriologists to undertake Griffith typing.

Epidemiology

The most striking epidemics of streptococcal infection are milk-borne. They are of comparatively common occurrence and are so impressive that they are believed by some to be the main source of spread. This is undoubtedly untrue, and in the epidemics about to be described no evidence of a food vehicle was found. Epidemiology is an oecological study, and the behaviour of an epidemic is influenced by its environment. For this reason one should hesitate to draw conclusions from isolated observations in time or space, and should be careful to pool as many experiences as possible before making deductions. The examples about to be described should be added to the pool, but as preliminary investigations they are of value because they deal with three distinct types of community. (1) *The semi-isolated community:* In this case a boarding school for boys in which contact with the outside world is limited and presumably the opportunity for introduction of new infection considerably restricted thereby. (2) *The general hospital*, in which the bacteriological environment of the inmates is particularly complex, since individuals living therein inevitably make contact with more diseased persons than they would meet with in their homes or elsewhere. (3) *The family*, which is probably the simplest unit of all and as such might well be the most satisfactory material for the study of a problem in clinical epidemiology.

Streptococcal Infection in a Boys' School

In Fig. 1 are given in graphic form the bacteriological findings from all upper-air-passage infections requiring more than twenty-four hours' exclusion from school in a community of about 320 boys during the years 1931 to 1934. The graph also includes the years 1929 and 1930, but during this period bacteriological observations were incomplete. It will be seen that during the six years dealt with six different types of streptococcus became established and gave rise to the spread of disease. The main incidence of disease was in the Lent terms. In 1931 there suddenly appeared a new type of organism which gave rise to sixty-three cases. Nine other positive streptococcal cultures were obtained: one belonged to the type of which the school had had previous experience, and eight were unidentifiable. They may not have been Group A organisms. *Str. pyogenes* was not recovered from forty-one cases, and it was clear that streptococcus Type 18 gave rise to the bulk (60 per cent.) of the cases encountered in the school at this time. In the following term (1931, II) one case only of Type 18 infection was

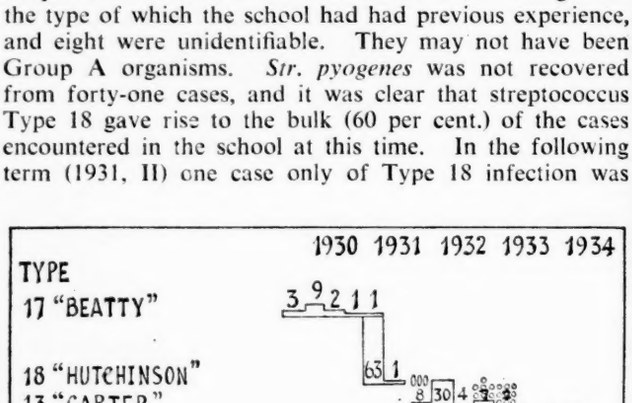

FIG. 1.—Serological types (Griffith) of *Streptococcus pyogenes* producing nasopharyngeal infections in a semi-isolated community (boys' public school, population 300 to 320).

found, although about the same number of non-coccal infections occurred in the school. Streptococcal fever had almost disappeared. In the third term of 1931 a new type of organism, Type 13, was first detected, and continued to produce disease for five consecutive terms. In the last two terms (1932, III; and 1933, I) a number of carriers of this organism were discovered, and were detected occasionally until the Lent term of 1934. (Their presence is indicated by a small circle "o" in Fig. 1.) Type 13, however, seemed to have either lost its power to become epidemic or the school was effectively immunized against it.

During the Lent term of 1932 another type of organism, which had at that time not been included in the Griffith classification and which is indicated in Fig. 1 as Type "X," made its appearance and gave rise to the bulk of the disease affecting the community. It appeared again at the end of the year, since when it has not been encountered. Type 1, a well-recognized scarlet fever strain, was first recovered from the throat of a new boy who showed no signs of disease, and it was not until fifteen months later that clinical cases of Type 1 infection

began to occur, and gave rise to an epidemic of forty cases of nasopharyngitis.

Although during the two subsequent terms four carriers of Type 1 were encountered, no further epidemic spread of this organism followed. At the beginning of the second term of 1933 a wave of non-streptococcal colds occurred. A month later, on June 11, in brilliant summer weather, a single case of scarlet fever appeared. Streptococci were not discovered in the throat, and the portal of entry appeared to be a trivial scratch on the boy's foot. It is interesting to record that a streptococcus giving a clinical picture very suggestive of Type 1 caused an epidemic in a neighbouring village during October and November, 1933, and there was some evidence that the infection had been carried by a school servant and had been kept going through the medium of one or two apparently sporadic cases of sore throat seen during the summer months. At the beginning of 1934 Type 6 gave rise to a small epidemic, and was detected in the school during two terms, after which it completely disappeared from the community; during 1935 and 1936 there was no epidemic spread of streptococcal disease, this organism having apparently been replaced by pneumococci.

It is tempting to speculate further upon the immunological implications arising out of Fig. 1. It was quite certain that infection with, let us say, Type 18 gave no immunity against infection with Type 13; in fact, there were some boys who reacted to all six types of infection. Other boys, although equally exposed, reacted to none. It is also possible that as the result of so many contacts with streptococci some form of group immunity had begun to result by 1933 and was effective in 1934 and 1935, when the health of the school was unusually good, but this improvement was more closely associated with a deliberate attempt to improve the hygienic conditions within the school by reducing, in September, 1933, the number of the community from 340 to 230 boys, and thereby attaining much more effective spacing in dormitories, classrooms, and playrooms.

The six epidemics described showed certain features which have now been seen so frequently that they may be considered almost characteristic of the epidemiological picture produced by the droplet spread of streptococci. Two of the epidemic periods have been described in greater detail elsewhere (Bradley, 1932a, 1932b), and can be compared with the observations of other workers (Glover and Griffith, 1931). Furthermore, one may conclude that streptococcal disease, unless milk-borne, spreads slowly and does not give rise to steeple-like epidemics or overwhelm communities with dramatic suddenness. The maximum incidence in the Lent term has already been referred to. Three or four weeks of a term often elapsed before cases occurred with sufficient frequency to cause anxiety of epidemic spread, and another month had passed before the epidemic had reached its peak, after which the decline in case incidence was gradual. The spread of infection was intensified by the simultaneous presence or previous occurrence of other catarrhal disease such as "influenza," non-coccal colds, or measles, the last-mentioned having a marked effect in elevating the passage of streptococci. The complications of influenza and measles were attributable to the streptococcal types producing coincident infection in the sick-rooms. On one occasion thirteen boys, with negative throat swabs at the time of admission to a sick-room for a non-coccal pyrexial nasopharyngitis, were brought into contact in the same ward with a boy suffering from primary streptococcal fever. Five of the thirteen, occupying beds adjacent to that of the streptococcal case, contracted secondary streptococcal disease; and a sixth, occupying a bed on the other side of the ward, also became involved (Bradley, 1932b). This is one of many similar examples in which ignorance allowed grave disease to spread among already sick boys. A more enlightened physician would have prevented the introduction of a streptococcal case into a non-streptococcal ward, and so have avoided a fatality. At present such a mistake can be excused because it requires extensive clinical experience to distinguish between streptococcal and non-streptococcal nasopharyngitis without bacteriological evidence. There are, however, no practical difficulties, cost excluded, against the immediate application of simple bacteriological techniques to this problem. Failing such aid, and even in epidemic times, every boy with nasopharyngitis of unexplained aetiology must be looked upon as a danger to the community and nursed on the barrier system until it is proved that he is not suffering from an infection not already involving his fellows.

It will be seen how during each term one, and occasionally two, types of *Str. pyogenes* established themselves and gave rise to epidemic disease, so that towards the middle of the term the flora of the school had become fairly constant, and the bulk of infection encountered was attributable to one Griffith type. Some months later another type would appear and apparently overgrow its predecessor. The latter would be recovered occasionally only, was not the obvious cause of new disease, and was apparently residing in an immune carrier. Strangely enough, these carriers did not start off new epidemics—possibly because, in a closed community, they were living in an immunized population. If this suggestion is tenable it is strong evidence that a person immune to one Griffith type is not protected against invasion by another. He will, however, be partially or completely protected against the rash-producing Dick toxin, which is produced in varying amounts by most, if not all, types of *Str. pyogenes*. The incidence of scarlet fever is therefore fortuitous and is no measure of the extent of streptococcal parasitism.

It may be assumed that there were six emergency periods when new infection was introduced to the school, and it is probable that had intelligent action been taken when first these infections were detected much of the sickness in the school could have been averted.

Spread of Streptococci in a General Hospital

These studies have been attempted in a provincial hospital. They are not comprehensive, since it has at times been difficult to obtain information regarding the occurrence of P.U.O. or nasopharyngitis, and in certain wards the investigations have, for one reason or another, been partial or inadequate. It is, however, probable that Fig. 2 is significant for about 120 hospital beds, mainly in the medical wards. During the twelve months beginning November, 1936, six types of *Str. pyogenes* gave rise to multiple cases of infection contracted during the patients' stay in hospital. Fifty such infections were observed, in seventeen of which scarlet fever, due to four Griffith types, was diagnosed. Two deaths were directly attributable to these infections; two other infected patients died prematurely. The problem is therefore one of considerable importance. The obstetrical, and ear, nose, and throat wards were not included in the investigation, and scant attention was given to the surgical wards. Yet it is in the last that ward infections with *Str. pyogenes* are known to do most damage. The hospital under

observation is well spaced and well equipped; the hygienic conditions are above the average. Fig. 2 attempts to show the probable direction of spread, but it is obvious that some intermediaries between the homologous cases were not detected, and that the lines of spread indicated in the diagram are in some instances guesswork. In the absence of an investigation of this type it would have appeared to a casual observer that scarlet fever was endemic in the hospital. Occasionally cases of scarlet fever were grouped, but more commonly it was impossible to associate them with other cases of this exanthem.

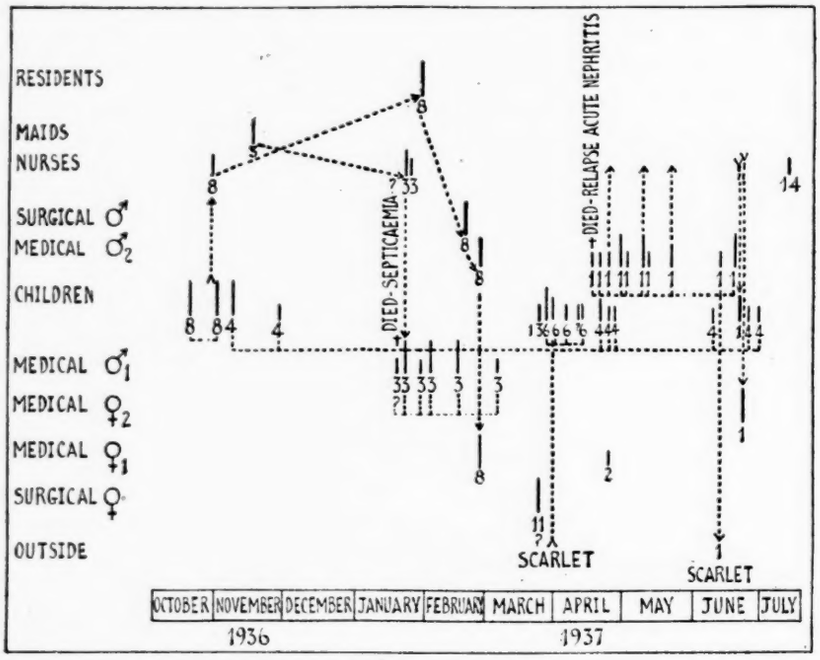

FIG. 2.

Scarlet fever
Scarlet, *sine eruptione*
Cold or sore throat
9 1 6=Griffith type of *Streptococcus pyogenes*

Yet the tendency was to relate the scarlet fever to a common source of infection, although, in fact, four distinct sources were responsible, one of which could be traced to a child admitted to the hospital with otitis media from a home from which two children had been removed to isolation with scarlet fever during the preceding fortnight. In three of the epidemics there was evidence that nurses had acted as intermediaries in the transmission, but there was nothing to suggest that nurses had been more active than other people in introducing the infection into the hospital in the first instance. Furthermore, where the spread was sufficient in amount to allow for deductions the evidence pointed rather to inter-bed spread. One of the most striking features of these infections was that they ended as suddenly as they began, although no special action was taken to control them. In two cases the spread came to an end immediately after dissemination to other wards had been observed.

Fig. 3 represents the picture from September, 1937, to January, 1938. During this period four and possibly five more infections were introduced.

We then tried to identify the source of the organisms, a fair picture of streptococcal flora of the hospital having been established during the previous months. Two cases of Type 25 infection followed the introduction of this type in a patient suffering from quinsy; a case of cellulitis gave rise to fifteen secondary cases of Type 6 infection. The routes of spread of Types 22 and 6 have been extracted from Fig. 3 and represented separately in Figs. 4 and 5. The Type 11 infection was apparently introduced by a patient with suppurating cervical glands; two of the secondary cases also had suppuration of the glands of the neck. It is not improbable that two Type

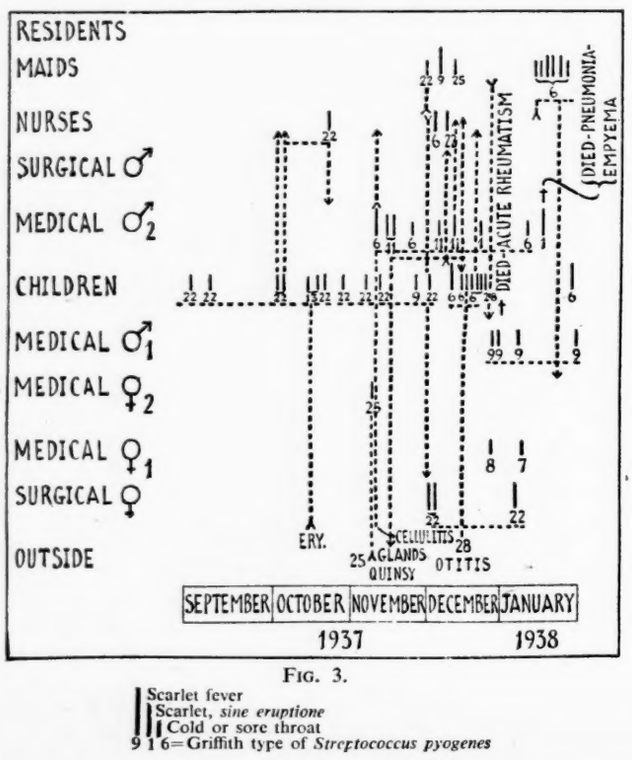

FIG. 3.

Scarlet fever
Scarlet, *sine eruptione*
Cold or sore throat
9 1 6=Griffith type of *Streptococcus pyogenes*

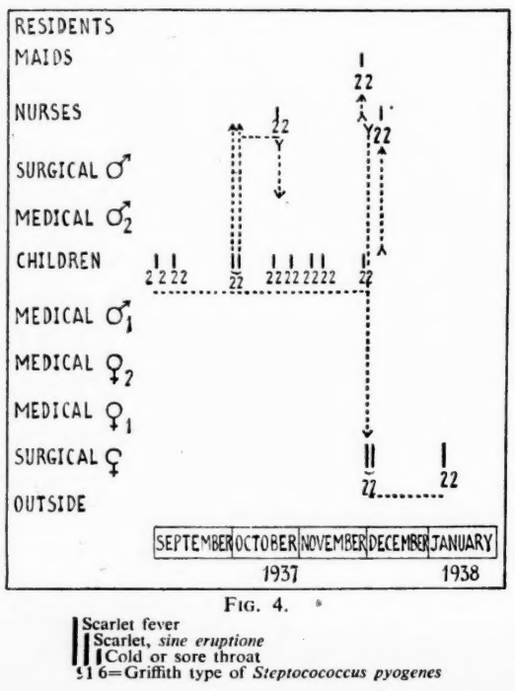

FIG. 4.

Scarlet fever
Scarlet, *sine eruptione*
Cold or sore throat
9 1 6=Griffith type of *Steptococcoccus pyogenes*

28 cases followed the introduction of this organism into the babies' ward by a case with otitis media due to the same type of streptococcus. A bacteriological "cross-section" of the hospital at this time, shall we say at the middle of December, would have shown an extremely complicated picture, since six types of infection were present, and it would have been impossible to draw conclusions from such an investigation. Other workers who have attempted to unravel this problem by serological methods have been disappointed by their results, not improbably because they have attacked the problem at a time when droplet infections of all sorts were particularly rampant. From Figs. 2 and 3 it is reasonable to conclude that the introduction of much of this disease to the hospital could have been avoided by the proper isolation of known cases of streptococcal disease, and that a considerable amount of dissemination could have been controlled had there been proper exclusion of nurses and doctors suffering from acute nasopharyngeal infections. At no time was there any need to postulate a chronic carrier, all spread being accounted for satisfactorily on the assumption that ambulant cases of or convalescents from acute nasopharyngitis were responsible. Again, in these hospital studies the slow tempo of streptococcal droplet spread is demonstrated. Three only of the fifty-one attacks of nasopharyngitis or P.U.O. represented in Fig. 3 were associated with erythematous rashes, and in none of these three cases was a diagnosis of scarlet fever made, although, of course, all the fifty-one cases (most of them being trivial in character) were potentially as dangerous to the community as fifty-one cases of scarlet fever.

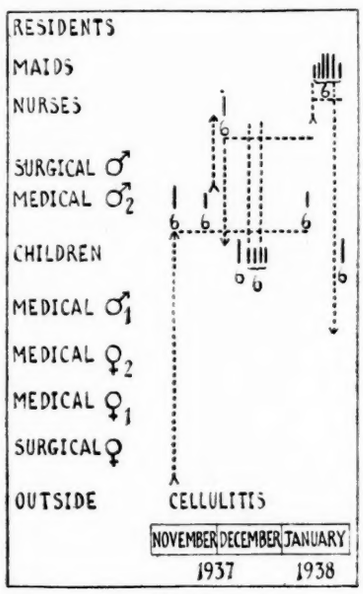

FIG. 5.

Scarlet fever
Scarlet, *sine eruptione*
Cold or sore throat
9 1 6 = Griffith type of *Streptococcus pyogenes*

In this connexion attention is drawn to Appendix A of Sir Arthur MacNalty's report on the state of the public health (1936), as it is probable that patients discharged from infected wards of a general hospital during epidemic times do considerable damage in their homes. Actually only three returned cases came to my knowledge. It will be appreciated that each small wave of infection was a separate problem, and that efficient prophylaxis at the very beginning of each wave would have made a considerable difference in the morbidity from these troubles.

Family Epidemics

There is considerable clinical evidence that the inhabitants of a small rural village will behave in much the same way as a semi-isolated community. In a larger population—for example, a county town—perhaps two or three types of streptococci will spread, while in a large city almost all the Griffith types may be encountered at different times during a period of twelve months. Thus the cultures obtained from fifty-six streptococcal infections in New York City during the first four months of 1936 fell into sixteen of the Griffith types (Bradley, 1937), and I am informed by Drs. Coburn and Pauli that during 1937 all the Griffith types were found to be producing disease in New York City. When, however, individual families are studied it is observed that the disease produced during a family epidemic results from one type of infection only, and many examples of this have been recorded elsewhere (Bradley, 1937). For the purposes of the present discussion one or two examples will serve to illustrate this point.

Case 1.—On February 20, 1936, a girl aged 12 contracted a pyrexial sore throat which lasted a week. On February 27 her brother, 15 months old, became ill, and later developed bilateral otorrhoea, and was under observation for mastoiditis. On February 28 another brother was taken ill with a cold, and ran a fever for three days. On March 3 the first patient, a known rheumatic subject, was admitted to hospital, where she developed an attack of carditis and polyarthritis which ended fatally. Type 6 streptococci were found in profusion in the throats of these three patients. Their mother had suffered a trivial sore throat on February 29, but throat cultures were free from haemolytic organisms by March 3.

Case 2.—In another family a girl aged 4 was removed to an isolation hospital on February 1, 1936, with a diagnosis of diphtheria, but was sent home on February 14, some doubt having been cast on the diagnosis. Two days later one brother developed a severe pyrexial cold with otitis, and after two more days another brother had a bad cold. The mother and a fourth child made no complaint of ill-health, but all five members of the family gave a profuse growth of Type 22 *Str. pyogenes*, and one boy developed an attack of rheumatism five weeks later, while still under observation.

Case 3.—On March 2, 1937, Gwendoline, daughter of a farm labourer in an English village, went to bed with a bad cold and felt ill until March 8. On March 7, however, she got up because her mother was delivered of a baby, the eighth in the family. She helped nurse her mother, who on March 10 became suddenly ill with puerperal fever associated with a scarlatiniform rash, from which she eventually died. Fourteen days after the onset of the mother's illness the father had "influenza," and Evelyn, aged 4, contracted a severe cold two days later, while still five days later, on April 1, Gladys, aged 17, had a cold, and on April 7 Fred, aged 14, contracted "influenza." On April 6 Gwendoline was troubled with pains in her lower abdomen, which persisted for three days. She was vaguely unwell until April 9, when her illness declared itself as typical rheumatic fever. Type 15/17 streptococci were recovered from the throats of four of these patients, but were absent from the mother's throat. A pure culture of this organism was, however, obtained from the pus in a pelvic abscess subsequently operated upon.

The mention of rheumatic fever in each of these histories results from the fact that the starting-point of an inquiry into these family epidemics was the study of that disease. A study of otitis media or scarlet fever or cervical adenitis might have called attention equally well to these family epidemics, and a similar state of affairs will be discovered in almost every family from which a case of streptococcal disease is admitted to hospital. Without doubt disregard for these apparently trivial colds and sore throats has defeated the existing legislation for the control of puerperal and scarlet fever, erysipelas, etc.

Discussion

This paper is mainly concerned with the epidemiological information forthcoming from the application of Griffith typing. Suggestions for the control of droplet spread are not made, for they depend to some extent on certain clinical aspects of the problem which will be discussed in a subsequent paper. Certain conclusions may, however, be drawn from the data presented:

1. The unitarian hypothesis outlined by Okell must be adopted.

2. With a few exceptions streptococci pathogenic to man fall into one group (Mrs. Lancefield, Group A), identifiable by a precipitin reaction with a carbohydrate "C" substance extracted with HCl. An organism not giving Group A "C" substance is in all probability, but not conclusively, not pathogenic to man. These human pathogens are divisible into about thirty Griffith types, which breed true in epidemics and are probably distinct and immutable antigens. They are identified by agglutination with absorbed sera, the latter reactions probably depending on a type-specific "M" substance. There is evidence that the clinical picture produced by some of these types varies in certain details from that produced by others.

3. The rash of scarlet fever must be looked upon as entirely fortuitous in its occurrence and as of little value in the assessment of streptococcal parasitism. The occurrence of rash depends on the coincidence of two variable factors: (*a*) a Dick-positive patient infected by (*b*) an organism with a high Dick-toxin content. The idea that scarlet fever is sometimes highly contagious and sometimes hardly contagious at all requires revision. The reason for this idea is now obvious.

4. Scarlet fever is, however, a most useful indicator of the existence of streptococcal disease in a community. Erysipelas, most puerperal fever, cellulitis, the bulk of otitis, and certain types of tonsillitis are similarly useful clinical indicators.

5. The aggregate of these indicators probably represents not more than one-half of the morbidity due to *Str. pyogenes* infections.

6. Present knowledge suggests that the great bulk of streptococcal disease (even when apparently sporadic and unassociated with a high incidence of *pyogenes* morbidity) is zymotic in character and associated with a raised carrier rate of streptococci, the enhanced parasitism being due to one type or, at most, a few types of organism in any one community at any given time.

7. Apart from occasional milk-borne spread, a striking phenomenon easily recognized in most instances, the bulk of streptococcal disease is transmitted by droplet. This common type of droplet spread has certain peculiarities. (*a*) It is a community disease. Spread within home, school, or other institution accounts for the greater part of the contagion. Casual contacts in street, vehicles, and shops, or from visiting relatives in the case of hospital patients, are relatively of minor importance. (*b*) Its tempo is comparatively slow, probably because transmission is mainly through immune carriers or subclinical cases. Often five and sometimes ten days elapse between the detection of even the most trivial infection in home or hospital ward. (*c*) The bulk of vector immune carriers are infected for a short period of time only. These transitory carriers must be distinguished from, and are probably of much greater importance than, persons suffering from chronically infected foci.

8. *Streptococcus pyogenes* is almost ubiquitous in temperate zones, and to many it presents an enormous and unassailable problem. These difficulties are simplified by the knowledge that a number of distinct serological types of organism are at work, each acting as a separate unit. Preventive measures might succeed in controlling some, if not all, of these units.

9. In practice, investigation and prophylaxis will start with the detection of one of the many clinical indicators mentioned in conclusion No. 4. If adequate steps are taken at the time of detection of a new Griffith type in any family or community there is a reasonable chance of aborting epidemic spread.

10. Legislation exists for the quarantine and isolation of three only of these clinical indicators. The existing rules are notoriously ineffective, and new regulations with corresponding legislation must be evolved. Isolation and other hospitals admitting acute streptococcal disease are, under present conditions and because of cross-infection (Allison and Brown, 1937; MacNalty, 1936) a potential source for the dissemination of new infections throughout a community.

11. Knowledge of immunological problems relating to *Str. pyogenes* is very incomplete, but it is probable that little or no cross-immunity or group immunity is conferred by infection with any one Griffith type, although homologous immunity probably persists for a considerable time after infection. Immunity to Dick toxin does not imply immunity to streptococcal infection and invasion.

12. A type-specific epidemic tends to run its course through a community and to die out spontaneously. Persistence of an epidemic or the occurrence of relapses should suggest the presence of another type of infection.

13. Control over streptococcal disease will not be obtained until it is realized that *Str. pyogenes* is one of the more common causes of colds, sore throat, and "flu." On the other hand, *Str. pyogenes* tends to spread more rapidly in a community already involved in an epidemic nasopharyngitis due to some other cause—for example, measles. The occurrence of streptococcal complications in measles and similar non-coccal infections is almost without exception part of a separate epidemiological problem. The presence of the complicating organism depends on a zymotic infection coincident with, yet independent of, the primary measles or other nasopharyngeal infection. The bulk of recent evidence contradicts the idea that organisms producing complications were already present in the patient before the attack of measles, etc.

14. Control does not necessarily depend upon complicated bacteriological techniques. Clinical methods are of greater fundamental value and must not be ignored.

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GLUCOSE-TOLERANCE CURVES IN 500 OBESE CASES*

BY

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The series consists of 242 males and 258 females. All the subjects were definitely obese, but did not necessarily present themselves for examination from this point of view; every case of obesity in which a glucose - tolerance curve was made during the last fifteen years has been included. No examples of gross endocrine disturbance, with the exception of diabetes, are given in this paper. It is possible that the series does not represent a fair sample of the obese population of the country, as the cases have, in the main, been derived from the better-off classes. A small proportion only have presented themselves because sugar has been found in the urine.

In discussing the question of obesity it is important to have some standard of normality from which to work. So far as it has been possible to ascertain, no such standard is available. One is therefore compelled to fall back on the weight tables published in the textbooks. These tables are not really tables of "normality," but have been compiled from people, apparently in good health, presenting themselves for insurance. The weight tables therefore express an average weight but not an index of normality. It is probable that the greater the age of the subject the greater the error. For example, a six-foot man at the age of 25 has an average weight of 11 st. 3 lb., while at the age of 42 a weight of 12 st. 3 lb. is given. There is thus a gain of one stone in under twenty years. This gain might be attributable in part to increased calcium in the bones, but could not be entirely due to this. It is likely there would be a loss of weight in the musculature with advancing years which would, to a large extent, set off the increase. It is hard to see how this increase can be explained except by the increase in fat laid down as life advances. There would appear to be little real reason for a normal person to increase more than a few pounds in twenty years. The same argument can be brought forward in the woman.

There would seem to be the same fallacy in the textbooks with regard to blood pressures—a rise here as age advances is looked upon as normal, whereas it is really an average, and is in any case a degenerative condition. In the absence of normal weight tables the average weight tables have been employed here.

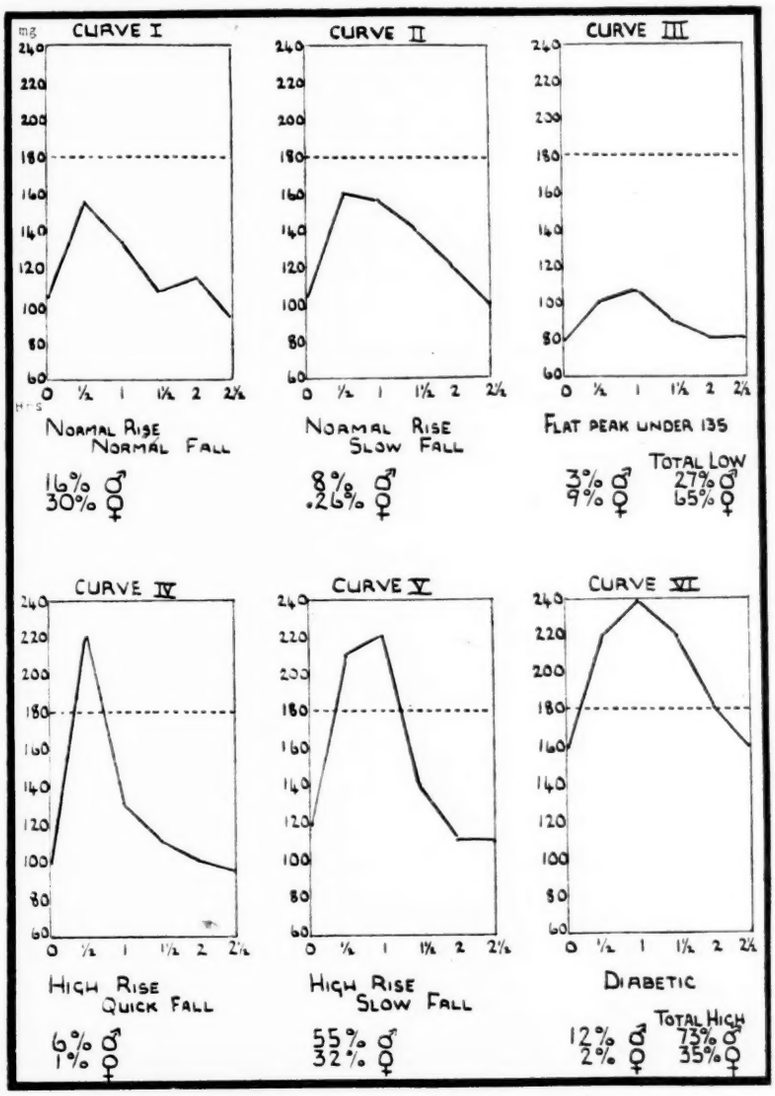

FIG. 1.—Glucose tolerance curves obtained in 500 obese cases.

Technique of the Tests

The glucose-tolerance curves have all been arrived at by the method of Hagedorn and Jensen. A standard technique has been adhered to for obtaining the glucose tolerance throughout the whole period of fifteen years. The patients are encouraged to follow their usual unrestricted dietary regime until the night before the test is made. On the morning of the test a standard breakfast is given at 8 a.m.: one cup of tea with milk, with one lump of sugar if usually taken; one slice (about 1 oz.) of bread or toast, and butter. The glucose-tolerance test begins at 10 a.m.; 50 grammes of glucose in 300 c.cm. of water are given directly the initial sample of blood has been taken. Urine is collected at the start, and at one hour and two and a half hours after the glucose.

Analysis of Results

The curves obtained (Fig. 1) have been somewhat arbitrarily grouped under six headings, and are conventionally recorded in this table.

TABLE I

Curve No. I.—A normal rise not above 180 mg. at the half hour and thenceforward a normal descent to below 120 mg. in the one and a half hours.

Curve No. II.—A rise not above 180 mg., but a slow descent not reaching 120 mg. in the one and a half hours.

Curve No. III.—A flat curve under 135 mg. throughout the two-and-a-half-hour period.

Curve No. IV.—A peak at the half hour above the 180 mg. line, but a return to the 120 mg. line or below at the one-and-a-half-hour period.

Curve No. V.—A peak at the half hour or one hour above the 180 mg. line, and failing to reach the 120 mg. line until the two-hour period.

Curve No. VI.—A "diabetic curve": a considerable elevation above the 180 mg. line, 120 mg. not being reached at the two-hour period. This curve has been called "diabetic," but it does not mean to indicate that the author considers that a curve of this type is definitive of the clinical condition diabetes mellitus.

* Read in the Section of Pathology at the Annual Meeting of the British Medical Association, Plymouth, 1938.

The most striking result from the analysis is the difference between the obese of the two sexes. The males show a total of 73 per cent. high curves for all ages, whereas the females show only 35 per cent. of high curves. This difference in response to glucose is still more pronounced if the percentage of high curves is plotted for

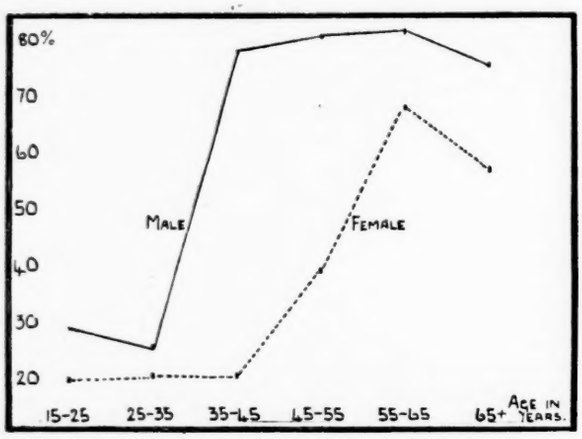

FIG. 2.—Percentages of obese cases showing high glucose-tolerance curves at various age groups.

the various decades, as in Fig. 2. Here we see that in the male up to the age of 35 years the percentage of high glucose-tolerance curves is below 30. After this age a sudden rise occurs, so that between 35 and 45 nearly 80 per cent. of obese males show a high glucose-tolerance curve, after which this high level is maintained up to the age of 65 and beyond. Obese women, on the other hand, show a very different picture. The percentage of high curves remains low until a decade later —45 years. The rise when it occurs is less sharp, the highest percentage of high curves (70) not being reached until the decade 55 to 65 years. From this it would appear that the condition underlying the obese state is different in the two sexes, or, what is more likely, a smaller number of women suffer from the defect commonest in men.

A striking difference is often evident in the post-mortem room. An obviously obese woman may be encased in layers of fat, but within this the body appears healthy and the muscles a bright red and not infiltrated with fat. In the male this is very rare, if it ever occurs, the musculature being heavily infiltrated with fat. With regard to the obese males showing normal or low curves, no distinct type could be picked out, but an analysis gives the following peculiarities:

Renal glycosurics	34%
Thick-set; barrel-shaped chest, short thick muscular limbs; athletic, intelligent	30%
Impotence; sex organ defects	6%
Patients already on diets—namely, gastric and duodenal cases	18%

In Table II an analysis of these obese subjects is shown, in which the percentage of high blood-sugar curves is correlated with percentage of overweight. The figures for the males are not very regular, but it would not appear that a male is more likely to have a high blood-sugar curve if he is 50 per cent. overweight than if he is even under 10 per cent. overweight. The female figures are more regular, with the exception of the first and last in the series, but give the same result. A woman 60 per cent. overweight is not more likely to show a high blood-sugar curve than one only 10 per cent. overweight.

TABLE II.—*An Analysis of the Cases*

Percentage Overweight	Percentage High Glucose-Tolerance Curves	
	Males	Females
Under 10	67	50
10 – 20	78	33
20 – 30	60	29
30 – 40	79	35
40 – 50	67	30
50 – 60	100*	33
Over 60	100*	57*

* Too few cases for accuracy.

Summary

In an analysis of 500 obese subjects (242 males, 258 females) it has been shown:

1. That high glucose-tolerance curves are obtained in 73 per cent. of males but in only 35 per cent. of females.

2. That up to the age of 35 high glucose-tolerance curves occur in only about 27 per cent. of males and 23 per cent. of females. Above this age about 80 per cent. of obese males have a high curve; but women always show a much lower percentage, only reaching a maximum of nearly 70 per cent. at the 55–65 age period.

3. That the percentage of high glucose-tolerance curves does not increase *pari passu* with an increase in the subjects' weight.

CORNEAL TRANSPLANTATION

RESULTS OF A SERIES OF 56 OPERATIONS ON 48 EYES*

BY

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At the B.M.A. Annual Meeting held at Oxford in 1936 I read a paper on the results of corneal transplantation, including some references to those obtained by other surgeons (Thomas, 1937). In the present paper my own results will be given and classified, but space will not permit me to enumerate those of others. It is gratifying, however, to know that excellent results are now being obtained by many surgeons in all parts of the world. The technique I employ is similar to that which gave me the best results in experimental rabbits (Thomas, 1931) and was afterwards used for operations on man (Thomas, 1935); but since the 1936 paper it has been modified in two ways—namely, by using saline instead of oil for receiving the graft, and by so arranging the cross-stitches that the knots do not lie on the graft or on its margin. These modifications were described at the Oxford Ophthalmological Congress in 1937 (Thomas, 1938), and their adoption appears to be justified by the results obtained since 1936.

The results of all my corneal graft operations from the first one in 1930, nearly eight years ago, to the fifty-sixth operation, four months ago, are here given. The scheme described in 1936 (Thomas, 1937) is again adopted for the classification of eyes as "suitable" or "unfavourable,"

* Read in the Section of Ophthalmology at the Annual Meeting of the British Medical Association, Plymouth, 1938.

and for the tabulating of the results obtained. It is to be emphasized that the result is to be judged by the clarity of the graft, taking into account any membrane that may have formed on its posterior surface. Thus one might have a clear graft on an amblyopic eye which only sees fingers at one foot, the result being classified according to the clarity of the graft rather than the vision obtained. This actually happened in one of my cases, where the operation was performed in the knowledge that the eye was probably amblyopic.

TABLE I.—*Classification of Fifty-six Operations on Forty-eight Eyes*

	Operations	Eyes
Group A.—Suitable eyes in favourable patients ..	26	23
B. „ „ „ unfavourable „	5	5
C.—Unfavourable eyes, due to :		
(*a*) extra-ocular conditions	10	7
(*b*) Intra-ocular conditions	14 (25)	12 (20)
(*c*) Extra-ocular and intra-ocular conditions ..	1	1

TABLE II.—*General Results of Fifty-six Operations on Forty-eight Eyes*

		56 Operations	48 Eyes
Successes	Group 1 : Clinically transparent	8	8
	„ 2 : Slight opacity	15 (35)	14 (32)
	„ 3 : Much opacity but less than original opacity	12 (62.5%)	10 (66.6%)
Failures	„ 4 : Opacity equal to or worse than before ..	19	14
	„ 5 : Graft detached ..	1	1
	„ 6 : Eye lost	1	1

For the whole series successful results were obtained in 62.5 per cent. of the operations and 66.6 per cent. of the eyes.

TABLE III.—*Cause of Opacity in Forty-eight Eyes*

	No. of Cases	Suitability Group				
		A	B	C(*a*)	C(*b*)	C(*c*)
Interstitial keratitis	9	9	0	0	0	0
Chemical burns ..	14	4	3	5	1	1
Measles and ulcers ..	14	7	1	2	4	0
Explosions	3	1	0	0	2	0
Ophthalmia neonatorum	5	1	1	0	3	0
Iridocyclitis and sclerosing keratitis	3	1	0	0	2	0

The results obtained in the nine eyes with interstitial keratitis were: Group 1 five, Group 2 one, Group 3 three, so that all nine cases were successes. The groups of chemical burns and measles and ulcers each showed nine successes out of fourteen.

TABLE IV.—*Results of Twenty-six Operations on Twenty-three Eyes in Group A (Suitable Eyes in Favourable Patients)*

		26 Operations	23 Eyes
Successes	Group 1	8	8
	„ 2	9 (24)	8 (22)
	„ 3	7 (92.37%)	6 (95.6%)
Failures	„ 4	2	1
	„ 5	0	0
	„ 6	0	0

The results of Group B showed one success out of five.

The results of Group C(a) (extra-ocular unfavourable conditions) showed four successes out of seven, while those of *Group C(b)* (intra-ocular unfavourable conditions) showed four successes out of twelve. The one case in *Group C(c)* was successful (Result Group 3); this case was particularly gratifying, because the patient has obtained enough vision to see to move about and look after himself, in spite of the fact that his eye before grafting showed considerable adhesion of the iris to the cornea and bands of scar tissue passing from the conjunctiva on to the cornea, and was regarded as very unfavourable for operation. The operation, however, has been amply justified by the modest result obtained.

TABLE V.—*Results of Grafts since 1936 (Modified Technique): Twenty Operations on Sixteen Eyes*

Results of Operations	Suitability Group				
	A	B	C(*a*)	C(*b*)	C(*c*)
Group 1	4	0	0	0	0
„ 2	3 (9 (100%))	0	2	3	0
„ 3	2	0	1	0	1
„ 4	0	0	0	4	0
„ 5	0	0	0	0	0
„ 6	0	0	0	0	0

TABLE VI.—*Summary of Results of Twenty Operations on Sixteen Eyes*

Results	20 Operations	16 Eyes
Group 1	4	4
„ 2	8 (16 (80%))	8 (14 (87.5%))
„ 3	4	2
„ 4	4	2
„ 5	0	0
„ 6	0	0

Successes in Group 1—that is, clinically transparent grafts—amounted to 20 per cent. of the operations and 25 per cent. of the eyes, compared with just over 13 per cent. and 15 per cent. respectively for the thirty-six operations on thirty-two eyes reported in the 1936 paper. The successes for Groups 1, 2, and 3 since 1936 are 80 per cent. of the operations and 87.5 per cent. of the eyes, compared with just over 58 per cent. and 65 per cent. respectively in the 1936 paper. These figures show improved results by the modifications in technique adopted in 1936.

TABLE VII.—*Results of Four Eyes Regrafted Since 1936*

Suitability Group	No. of cases	Result Grouping	
		Before Regrafting	After Regrafting
A	1	3	2
C(*a*)	1	4	2
C(*b*)	2	3	2
		4	4

The results of these four cases therefore show improvement in three and no alteration in one. Before the 1936 paper four cases—two in Group A and two in Group C(*a*)—were regrafted, the results showing no improvement in any of them. These facts lend support to the

view that the modifications in treatment since 1936 have increased the chances of success both in suitable and in unfavourable eyes.

Maintenance of Improvement after Corneal Grafting

Perhaps one can best obtain the facts necessary to estimate the chances of maintaining the results of corneal grafting by considering the thirty-two eyes operated on up to 1936 and then reported. The patients were operated on in the period between seven and a half and two years ago. Two died before 1936, and in the case of the remaining thirty, seven grafts are now classified under a new result grouping. Three out of four eyes (Suitability Group A) show deterioration to a lower result group: one from Result Group 1 to Group 2 and two from Group 2 to Group 3. The fourth eye showed improvement from Group 3 to Group 2. Three eyes (Suitability Group B) showed deterioration: one from Result Group 2 to Group 4, one from Group 3 to Group 4, and one from Group 4 to Group 6.

These figures show that out of thirty grafts one improved and six deteriorated, while twenty-three remained as before over a period of some years. Seventeen of the thirty grafts were recorded as successes in 1936, and now, after a period of years, 14 are still so recorded. It is of interest to note that the patient whose graft improved was a case of interstitial keratitis, and the patient whose eye had to be removed owing to ulceration, a long time after the graft operation, was a very intractable young child who was able to give her eye very little fair treatment. One of the patients whose graft deteriorated from Result Group 2 to Result Group 3 is well known to our president, Sir Stewart Duke-Elder, and there were perhaps a few special reasons to account for the deterioration, such as chronic conjunctivitis and a tendency to recurring ulceration. There was also the common factor in these cases done before 1936 that oil was used for the reception of the graft, and probably it contributed to the deterioration in this patient's graft. The eye was regrafted six months ago, and the result grouping has thereby been raised from Group 3 to Group 2.

Summary

In the whole series of cases 62.5 per cent. of the operations and 66.6 per cent. of the eyes operated on were successes. The nine cases of interstitial keratitis were all successes, five of them exhibiting grafts that were clinically transparent. Operations on favourable cases showed 92 per cent. successful.

The results of cases operated on since 1936 by the modified technique show 80 per cent. of the operations successful, while the nine classified as favourable cases were all successful, and four of them had clinically transparent grafts.

The latter group of figures show improvement on the 1936 results, as do the results of the four regrafting operations, three of them being beneficial. While it is a fact that some grafts will fail to maintain the initial degree of transparency, this paper shows that in a series of thirty corneal grafts observed over a period of years one actually improved and six deteriorated. Three of these were in favourable cases, and although they deteriorated were still successful. The other three were in unfavourable cases. It is anticipated that with the modified technique now used the deterioration of 20 per cent. of the grafts over a period of years will be considerably reduced. At any rate, of those done before 1936 80 per cent. maintained their improvement.

In conclusion it is of interest to note that my best visual result is 6/9, and there are others with 6/12 vision, so that it is quite possible to obtain practically normal vision after corneal transplantation. One of my patients recently read four novels in ten days while on a voyage—two years after her operation.

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VITAMIN C IN THE TREATMENT OF WHOOPING-COUGH

BY

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The introduction of an effective treatment for whooping-cough is a matter of no little importance, since this disease now causes more deaths in this country than does any other infectious fever (Harries, 1938).

It seems true to say that although "nearly every newly discovered remedy in ancient and modern times has at one time been advocated for treatment of this disease" (Abt, 1937), there is not one that has been proved to have an appreciable effect on its course. Of vaccine or endotoxin therapy, lately so enthusiastically recommended, the conclusion of such an authority as Harries "that the more carefully the results are controlled the less impressive do they become" seems inescapable in the light of recent reports (Begg and Coveney, 1936; A. R. Thompson, 1937).

Earlier Experiences with Ascorbic Acid

The use of vitamin C or ascorbic acid as a remedy for whooping-cough was first reported by Otani (1936) from Tokyo. He found that ascorbic acid when added to a solid medium on which *H. pertussis* was grown inhibited the growth of that organism. The organism so cultured had impaired virulence when injected into rabbits. (Apparently these results were not controlled by substituting for ascorbic acid some other substance having a similar powerful reducing action.) Grootton and Bezssonoff (1936) also found that ascorbic acid in concentrations as small as 0.008 per cent. inhibited the growth of *H. pertussis* in culture media, whereas it had no such effect upon other organisms at concentrations up to 0.5 per cent. Acetic acid in similar amounts was found to be inert. Otani also found that in the presence of ascorbic acid the intradermal injection of *H. pertussis* toxin produced a diminished reaction in the rabbit: this effect was noted either when the ascorbic acid was mixed with the toxin or when the animal received a previous large dose of the acid. From these experiments Otani concluded that ascorbic acid specifically antagonizes the growth of *H. pertussis* and also inactivates its toxin. Scant details are given of the results of treatment of eighty-one patients with whooping-cough who were given intravenous or intramuscular injections of 50 to 200 mg. of ascorbic acid every two to three days; sixty-six of these were thought to be improved and fifteen unaffected. Results were better when treatment was started within the first week of the paroxysmal stage.

Ormerod and UnKauf (1937) of Winnipeg independently reported favourable results with ascorbic acid. They showed that "unsaturation" with ascorbic acid was common in cases of whooping-cough, a fact which was suggested also by the observation of Woringer and Sala (1928) of four cases of scurvy developing in the course of the disease. Using the urinary excretion method of assessing ascorbic acid saturation they worked out a standard dosage sufficient to saturate every case within a few days, irrespective of age or weight, and to maintain saturation throughout the course of the disease. Twenty-seven patients so treated were described: twenty-two were children whose symptoms had been present less than three weeks—that is, cases comparable with my series. The average duration of symptoms was nine days before and a further fourteen days after treatment was started, giving twenty-three days as the average course of the disease—a figure which is decidedly below that usually found in this country. There were no controls in this series.

The Present Series

This communication gives the result of treatment of forty-one children with whooping-cough, twenty-one of whom were treated solely with large doses of vitamin C, and twenty served as controls. They were seen as out-patients once a week; they became "treated" or "control" cases according to the day of the week on which they were first seen. Only those cases are included in this series which satisfied one or more (in the majority at least two) of the following diagnostic criteria:

1. *H. pertussis* recovered from cough plate.
2. A typical paroxysmal cough witnessed.
3. A suggestive history combined with the presence of *either* a sublingual ulcer *or* a marked lymphocytosis.

Only those whose cough was of less than three weeks' duration when first seen are included. The mothers were asked to note down on a form the number of paroxysms occurring during each separate day and each night, thus making the assessment of progress and of cure as objective as possible. In this way there was little need to rely on the parents' impressions as to whether the child was better or not. When the night cough had entirely ceased and the day cough was either absent or, if present, was stated to be quite slight and lacking a paroxysmal character, the patient was discharged. Each child was also weighed weekly, for in a disease where vomiting and loss of appetite are often prominent symptoms the child's weight chart was found to be a valuable guide to progress.

The Dosage Used

Conditions precluded any urinary or other estimations; therefore the policy was adopted of giving each "treated" child very large doses of vitamin C. The results of Ormerod and UnKauf were utilized when deciding on a standard dosage which was sufficient to ensure the rapid attainment and maintenance of "saturation." The dosage adopted was: first week, 200 mg. daily; second week, 150 mg. daily; third and subsequent weeks, 100 mg. daily, given in divided doses. This dosage was independent of age or weight except that patients under 1 year were given half these amounts. (These doses compare with 25 mg., the approximate daily requirements of the normal child.) The total weekly dosage is almost the same as that found necessary by Ormerod and UnKauf to ensure "saturation," and is considerably more than that employed by Otani. The form of ascorbic acid generally used was "ceetamin," a concentrate from natural sources; this was preferred to the synthetic product in view of the possibility that the latter is not identical in action with the naturally occurring vitamin (Elmby and Warburg, 1937). A few of the younger children received the synthetic acid (redoxon) as its smaller bulk was occasionally an advantage.

The controls were given cod-liver oil (15 per cent.) in malt in doses up to 1½ oz. daily, depending on age, and a mixture containing belladonna and bromide—drugs which are generally admitted to be without effect upon the duration of the disease (T. Thompson, 1929).

Results

The comparative results were as follows:

	"Treated"	Controls
Number of cases	21	20
Average age	2 yrs. 11 mos.	3 yrs. 4 mos.
Average duration of symptoms before treatment	10 days	14 days
Average duration of symptoms after treatment	25 ,,	27 ,,
Average total duration of illness	35 ,,	41 ,,
Average total weight gained during treatment	0.79 lb.	0.78 lb.
Average weight gained per week during treatment	0.22 lb.	0.20 lb.

The number of cases which were lost sight of before they had been discharged amounted to about 20 per cent. of the total, but as there was no appreciable difference between the number or type of cases lost from the "treated" and from the control series, it is considered legitimate to ignore this factor.

Complications.—The apparent incidence of complications is valueless where every case is not followed up, for it is just those cases which develop complications that may fail to report. Of the two cases of bronchopneumonia which are known to have occurred one was in the "treated" series (where it proved fatal) and one in the control series. These two cases are not included in the above results.

Summary and Conclusions

Twenty-one cases of whooping-cough have been treated with large doses of vitamin C. The illness lasted an average of thirty-five days, compared with forty-one days in twenty control cases, a difference which lies within the limits of statistical error.

The average rate of weight gained was practically the same in both the "treated" and the control cases.

These figures are in keeping with the general clinical impression that there was no striking difference in the course of the disease in the two sets of cases, and the assertion of Ormerod and UnKauf that the paroxysmal period of the disease is shortened "from a matter of weeks to a matter of days" was not confirmed.

In comparing these results with those of Ormerod and UnKauf it is seen that the average course of the disease in the cases treated with vitamin C was thirty-five days in the present series as compared with only twenty-three days in the Canadian series. The two sets of cases appear to be comparable in so far as the average period for which symptoms had existed before treatment was prac-

tically the same in both series. As there were no controls in the Canadian series, however, it is impossible to judge whether the natural course of the untreated disease varies in the two countries, or whether the considerable difference in the course of the disease in the present and in the Canadian series is due, for instance, to the application of a more rigorous standard of cure in the former series.

It is considered that the statement that the administration of vitamin C in whooping-cough has an effect upon the course of the disease is at present unproven.

My thanks are due to Dr. Donald Paterson for permission to publish these results relating to patients under his care and for his enthusiastic encouragement, to Dr. D. N. Nabarro for the haematological work, and to Dr. D. B. Bradshaw for the bacteriological work. Generous supplies of vitamin C preparations were given by Messrs. C. L. Bencard and by Messrs. Roche Products Limited.

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Clinical Memoranda

Recent Experience in Typhoid Fever

The following notes may prove interesting in connexion with the leading article in the *Journal* of May 21, and the papers by Fenton, Hay, and Felix in the same issue. An aberrant case of typhoid fever occurred in a small boarding house.

The patient, a commercial traveller, was infected while going his rounds in the West of England. He admitted feeling out of sorts for a week before December 1, 1937, when his illness started abruptly with fever and pain in the right side. Commencing pneumonia was diagnosed, but four days later typhoid was suspected on account of abdominal symptoms, including the passage of blood per rectum. Incidentally there was a history of gastric ulcer five years previously. At this time blood culture together with examination of faeces and urine and the Widal reaction were negative, nor was there leucopenia. A blood count on December 11 showed a slight relative and absolute increase of polymorphs, but a further Widal test on the same date was now strongly positive for *B. typhosus* (*B. typhosus* H = agglutination up to 1 in 2,500, and *B. typhosus* O = agglutination up to 1 in 1,000).

The patient was admitted to hospital on December 11 and died on December 23 from toxaemia and respiratory failure. On admission he was obviously very ill. He was delirious, his tongue was very dirty, there were signs of recent epistaxis, and he had a slight cough and was passing blood per rectum. The abdomen was moderately distended, with gurgling in the right iliac fossa. The spleen was not palpable, but there was tenderness in that region. A few rose spots were present on the lower costal margins and one to the right of the umbilicus. Although he gave a history of not more than twelve days' illness he was clinically in the third week. In addition to general treatment he received intramuscular injections of Lister Institute typhoid serum of 30 c.cm. each on December 14, 15, and 16 without any apparent benefit.

While in the boarding-house the patient was nursed by the owner's wife, who also prepared food for other residents, one of whom was a baker in a large establishment. It seemed likely that some of the household would be infected, and, apart from taking the baker off his work, the problem was what other steps were indicated.

We decided, with their consent, to give each of the six persons in the house 12 c.cm. of Lister Institute serum in order to produce, if possible, some degree of temporary passive immunity. A week and also a fortnight later this was followed up with the usual doses of T.A.B. vaccine (Lister Institute) with a view to producing active and more permanent immunity. We believe that there is a real danger of "provocation typhoid" if vaccine is used alone in such circumstances, and we suggest that pretreatment with serum is logical, and may possibly be sufficient in itself. No secondary cases occurred and no ill effects followed the inoculations. The sixth member of the household was a temporary visitor and had serum only so far as we know. Unfortunately circumstances were not favourable for subsequent blood examinations of the contacts, but one of us is able to vouch for the efficiency of the vaccine from controls taken elsewhere.

Regarding sulphonamide in enteric fever, one of us has tried this drug by the mouth in one case of typhoid and in several of paratyphoid B. In the latter it appeared to have a favourable effect, but it must be admitted that cases of this disease which come under treatment early often run a mild course. The single case of typhoid was a severe one, but recovered eventually. The drug had no effect one way or the other, and as the patient was found to be a temporary urinary carrier in convalescence and was a chronic faecal carrier on discharge, it would appear that sulphonamide has no bactericidal properties in typhoid fever.

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Ether Convulsions, with Recovery

The use of evipan in ether convulsions was first described by R. F. Woolmer and one of us (S. T.) in 1936. Its value was independently discovered by J. S. Marr (1936), and one month later T. H. Chadwick (1936) reported his case. Dr. H. H. Pinkerton's recent account of the successful treatment of ether convulsions with evipan in the *Journal* (1938) prompts us to record two similar cases.

CASE RECORDS

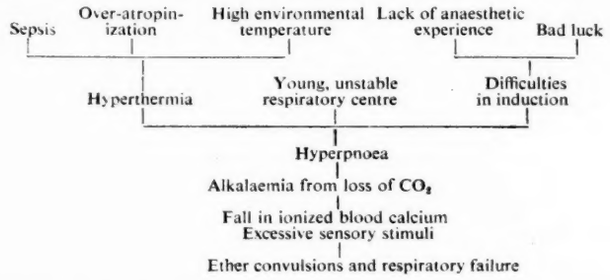
Case 1.—A child aged 4 years was undergoing operation for double mastoid suppuration. The anaesthetic was ethyl chloride, followed by open ether, then by ether vaporized with oxygen. When anaesthesia had been in progress for sixty minutes, and as the operation on the second ear was starting, typical ether convulsions began. The convulsions were unrelieved by oxygen and CO_2 and the removal of the clothes. Evipan was then injected intravenously, and when 8 c.cm. had been given the convulsions ceased. So too did respiration, and after half a minute of CO_2 and artificial respiration the pulse also stopped. Coramine, 1.5 c.cm., was then injected into the heart, and within a few seconds pulsation started once more. Artificial respiration was continued, and three minutes later spontaneous respiration began. The respirations increased in volume, and the child made a complete recovery. The operation on the second ear, however, was temporarily abandoned. The theatre temperature was 80° F., and the rectal temperature, after five minutes with no clothes on, was 101.5° F. The ether contained traces of aldehyde, but no peroxide. Two days later the second operation was performed, with the same anaesthetic, but paraldehyde ʒ iiss was given beforehand. There was no recurrence of the convulsions.

Case 2.—A girl aged 11 years was undergoing operation for a typical acute appendix (temperature 102° F., pulse 140). The anaesthetic was ethyl chloride, followed by open ether and oxygen. There was no struggling during induction, and no CO_2 was given. After forty-five minutes, as the peritoneum was being closed, typical ether convulsions began. These were unrelieved by oxygen, CO_2, and chloroform. After three minutes of convulsions, evipan having been prepared, 2 c.cm. injected intravenously stopped them at once. They did not recur, and the patient made a complete recovery.

In the first case an overdose of evipan was undoubtedly given, probably because the injection was continued steadily until the convulsions ceased. Had 2 or 3 c.cm. only been injected and a short time allowed for this amount to circulate, it would almost certainly have been enough. We suggest that when 2 or 3 c.cm. have been given the anaesthetist should pause for at least one minute, and only inject more if at the end of that time convulsions have not stopped.

AETIOLOGICAL FACTORS

We venture to offer the following diagram, summarizing the known aetiological factors in ether convulsions and providing a provisional theory of their cause. It is rare for all the aetiological factors to be present in one case.



It is well known that ether convulsions are prone to occur in acute septic cases (see the above diagram), and we wish to draw attention to a paper by Rosenow and Tovell (1936). These workers took nasal swabs from patients during ether convulsions, and from them grew streptococci. These were injected into rabbits, which, when anaesthetized with ether, in their turn developed convulsions. Nasal swabs from the same patients, taken some days later, gave a growth of the same streptococci, but this time the injected rabbits failed to convulse under ether. They suggest, therefore, that a streptococcal nasal infection plays some part in the production of ether convulsions. This work appears to have been done very carefully, and we feel that it is worthy of repetition whenever the opportunity occurs.

In spite of the efficacy of evipan as an anti-convulsant we think that the best "cure" for ether convulsions is their prevention. We suggest, therefore, that when acute sepsis in a child or young adult demands surgical intervention, open ether is not the anaesthetic of choice. It would be safer to rely on gas and oxygen with a minimum of ether or, better still, cyclopropane if a general anaesthetic is considered necessary.

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Reviews

DEFICIENCY OF VITAMIN A AND OF VITAMIN E

On Deficiency of A-Vitamin and Visual Dysaptation. II. By C. Edmund and Sv. Clemmesen. (Pp. 52; 5 figures, 7 tables. 3s. 6d. net.) Copenhagen: Levin and Munksgaard. London: Humphrey Milford. 1937.

Effect of Chronic Vitamin E Deficiency on the Nervous System and the Skeletal Musculature in Adult Rats: A Neurotropic Factor in Wheat Germ Oil. By Larus Einarson, M.D., and Axel Ringsted, M.D. (Pp. 163; 95 figures, 2 plates. 12s. 6d. net.) Copenhagen: Levin and Munksgaard. London: Humphrey Milford. 1938.

The first of these two volumes is a report of recent investigations by Drs. Edmund and Clemmesen into the relation between vitamin A deficiency and visual dysaptation. The subjects were pregnant medical patients, patients examined before and after administration of carotin oil, hospital nurses and male hospital attendants who receive a comparatively good diet. The authors confirmed their previous estimate of the "normal" power of distinction, and, taking this as the standard, they found that only fifty-two of their medical patients in the spring showed dysaptation. There was a certain amount of seasonal variation in the subjects who received a comparatively good diet. These later findings were decidedly lower than those previously reported, and the authors conclude that this may be accounted for by the recent agitation in Denmark for diets rich in vitamins, and particularly by the inclusion of vitamin concentrates in margarines. Intramuscular injections of carotin oil were slow in acting, taking twelve to forty-eight hours to show any effect, whereas similar injections of vitamin A from liver oils brought about an effect in two minutes and oral administration in less than twelve hours. An investigation of the diet of a certain prison indicated that each prisoner received about 1,225 international units of vitamin A per day. These prisoners showed seasonal variation in their power of distinction. Others who received an additional 150 units per day in the form of fresh milk did not show the seasonal variations. Hence an allowance of 1,370 international units of vitamin A per day was considered to be necessary for an adult. It is a useful attempt to determine by the aid of experiment how much vitamin A is required by a healthy adult. Previous estimates of the adult's need have mostly been made by the examination of "typical diets" of apparently healthy human beings.

Drs. Einarson and Ringsted have reinvestigated the findings of one of them (1935) that adult rats fed on a vitamin-E-free diet for a long time exhibited certain neurological disturbances. Until they can use vitamin E in a pure form the authors will not claim to have proved that these disturbances are due to vitamin E deficiency, but vitamin E and the neurotropic factor have so many similar biological and chemical properties that they conclude that the condition noted in the rats is indeed caused by a lack of vitamin E. Full details of the feeding and care of the animals are given. It was found that the neurotropic factor present in wheat-germ oil was stored in the organism in depots and withdrawn relatively slowly. Paresis appeared in the rats after feeding on the vitamin E diet for a few weeks. If treatment with wheat-germ oil was begun within the first six weeks of this special feeding, paresis did not develop; but if treatment was begun after eight weeks of this feeding paresis appeared six to eight weeks later. Wheat-germ oil

could not cure the paretic condition, but it could prevent its further development. The development of paresis is gradual; the hind legs show a pronounced straddling in walking, there is distinct atrophy of the musculature of the hind quarters and lower extremities, but the forelegs are normal. Later the hind legs are kept greatly abducted, and finally the rats are quite unable to walk about, but may drag themselves forwards with the forelegs. Death does not result even after twenty to twenty-four months of this condition. A very detailed account is given of the methods adopted for the histological examination of the tissues. There are ninety-five figures in the text and two plates, all well reproduced. The detailed descriptions of these are given in the text. The authors deal fully with the normal anatomical conditions and with the structures as influenced by the dietary deficiency. There is a full discussion of the possible (or impossible) relation of these conditions and those of animals depleted of other vitamins—A, B_1, or B_2.

A FRENCH TREATISE ON PSYCHIATRY

Psychiatrie Médicale, Physiologique et Expérimentale. By H. Baruk. (Pp. 828; 125 figures. 220 fr.) Paris: Masson et Cie. 1938.

This large treatise on psychiatry by one of the foremost French psychiatrists is welcome as an exposition of modern work in that country. The first part is concerned with a discussion of the anatomical-clinical approach which tends to seek localizations for various lesions and syndromes. While this may be more or less profitable in neurology, in psychiatry there is a tendency for those who adopt this approach to forget the fact that in its higher functions the cortex, and indeed the brain, tends to work as a whole. To illustrate this Dr. Baruk refers at length to his own work on the psychomotor syndrome of catatonia. However produced—in the course of schizophrenia, as a result of toxaemia, or by the administration of bulbocapnine—it must be a diffuse cerebral lesion, since it is associated with deliria, with inhibition of the will, and disturbances of all sorts of psychic as well as motor functions. It is, in fact, a suspension of initiative. Using the same methods the author discusses hysteria, and believes that this is due to certain analogous physiological disturbances less profound, and therefore more readily reversible, than those found in catatonia. In the light of these ideas the duality of organic and non-organic syndromes may be resolved, the organic series being represented by changes which are more localized and irreversible, and non-organic or functional syndromes by those which are more diffuse and more superficial.

In the second part the author discusses psychiatric diagnosis and classification, and deprecates the insistence on hard-and-fast nosological entities such as those suggested by Kraepelin; he would prefer to talk of simple reactions to different aetiological factors. These reactions differ according to the localization and intensity of the neurological dysfunction. On this basis the author formulates a classification arranged in accordance with disturbed function. This point of view helps to explain the remarkable variations met with in many psychoses, their remissions, relapses, and spontaneous cures, etc.

The third part deals with treatment and management. Dr. Baruk again protests against rigidity in diagnosis and against absolutism in prognosis, which paralyses efforts at treatment. He lays special stress on a thorough investigation of the psychological background of each patient and all the possible aetiological accidents to which he has been exposed, and considers that such investigation will demonstrate opportunities for therapeutic intervention. Finally, he discusses certain imperfections in the French law of 1838 dealing with the treatment of mental patients, and gives his notions of the proper organization of psychiatric treatment, in which one of the most important factors is the correct "moral atmosphere."

The book is illustrated by numerous tables, curves, and statistical data, and is furnished with a comprehensive bibliography. It is certainly deserving of close study by British psychiatrists, who cannot afford to neglect the ideas of their Continental colleagues.

DUKE-ELDER'S "OPHTHALMOLOGY"

Textbook of Ophthalmology. Volume I. The Development, Form, and Function of the Visual Apparatus. By Sir W. Stewart Duke-Elder, M.A., D.Sc.St.And., Ph.D. Lond., M.D., Ch.B., F.R.C.S. Second Impression, with Corrections and Additions. (Pp. 1136; 1022 figures, including 7 coloured plates. 63s. net.) London: Henry Kimpton. 1938.

In our review of the first volume of Sir Stewart Duke-Elder's *Textbook of Ophthalmology* (July 23, 1932, p. 149) we recorded high appreciation of the work in words that we cannot do better than repeat: "This first volume is in our judgment a great book. It is great by reason of its bulk, for it exceeds a thousand pages; it is great in its conception, and also great in its achievement. The author may well be congratulated upon such a piece of work—upon his ability to produce it and his industry in producing it. Whichever way this book is examined its high standard is confirmed."

It must be a source of gratification both to the author and to the publisher that after so short a time a second edition of this work has been called for. Such a fact confirms the widespread recognition of its value to all English-speaking ophthalmologists. In his new preface the author states that advantage has been taken of the reprinting to correct and make additions to the first edition. In certain sections fundamental advances in knowledge have rendered the original text misleading, such as those relating to ocular pigment and the neurogenic origin of pigmented tumours, the biochemistry of the eye, the nature of the intra-ocular fluids, the physicochemistry of the vitreous body, and the chemical and electrical reactions in the retina. We wish this new impression as complete a success as the first.

FITNESS AND NUTRITION

The Wheel of Health. By G. T. Wrench, M.D.Lond. (Pp. 146; frontispiece. 6s. net.) London: C. W. Daniel Co. Ltd. 1938.

The relation of nutrition to physical fitness and the maintenance of health is to-day receiving much emphasis. Indeed, perhaps one of the most remarkable features of recent progress in medical science is the recognition that many pathological conditions, whose origin had previously been obscure, are primarily the result of nutritional defects. In his book *The Wheel of Health* Dr. Wrench has given expression to this reorientation of views in regard to the causation of disease which is also being experienced by many of his fellow-workers. The author takes as the text of his essay the Hunza people of Northern India. These people are relatively secluded in the fertile Hunza valley, and have impressed many observers with their fine physique and their comparative immunity from many of the diseases which affect their neighbours. They are capable of almost incredible feats of physical endurance, and obviously provide an excellent opportunity for the study of those conditions of life which allow the most perfect development of human physique and the maintenance of

bodily health. From a consideration of the Hunza people Dr. Wrench passes on to a brief review of the classical studies of Sir Robert McCarrison, studies which may rightly be regarded as the starting-point for the inquiries into the relation of diet to health which have been carried on since with increasing intensity. Reference is also made to the diet and health of other races of mankind, to the observations on the health of the Danish population during the late war when rationing had to be extensively controlled, and to the work of McGonigle and others in this country.

The evidence which the author collates in support of the primary function of effective nutrition in the maintenance of health is very impressive. He concludes, indeed, that "disease is the censor pointing out the humans, animals, and plants who are imperfectly nourished." If at times he lays himself open to the criticism of overemphasis on nutritional factors, there are many who would agree to-day that this is an excusable fault. His case is so strong, however, that it in no way lessens the importance of his argument to suggest that what is most required now is to differentiate possible genetic factors which may complicate nutritional problems. It is well known that different individuals show a different susceptibility to dietetic defects, and recently in the laboratory a Mendelian variety of rats has been obtained which succumb to rickets when the vitamin content of the diet is lowered more readily than normal rats. How far can such genetic factors account for differences in physique in different groups of mankind? Dr. Wrench lays considerable stress on the physique and health of the Hunza people, but he also states that these people are "unique in racial characteristics." Hence, to the reader it seems at least possible that genetic racial factors may be contributory to observable differences in physique.

Dr. Wrench writes in a pleasant and stimulating style. He has done good service in bringing together in this essay the results of some of the best and most illuminating studies on nutrition in man and in pointing out the importance of these researches to social problems of to-day.

W. LE G. C.

ELECTROTHERAPEUTICS

Electrotherapy and Light Therapy. By Richard Kovacs, M.D. Third edition, thoroughly revised. (Pp. 744; 307 figures; 1 coloured plate; 57 tables. 35s. net.) London: Henry Kimpton. 1938.

Dr. Kovacs has been called upon within five years to produce a third edition of his book on electrotherapeutics. This follows the lines of the previous two, with additions and fresh chapters where progress in one particular line, such as hyperpyrexia, has taken place since the last edition. The work remains an admirable textbook written in attractive style, and is really valuable to English practitioners—an exceptional merit in a book written on electrotherapeutics by an American practising physician. Indeed, it seems certain to be recognized as a standard textbook for many years to come, and will therefore pass through further editions. The present seems therefore to be an opportune moment to put forward some constructive suggestions.

The book would undoubtedly gain if it were cut down considerably; the author's desire for clarity of explanation and completeness in all techniques has made it become "almost encyclopaedic in character." Some of the illustrations serve no useful purpose; an indistinct view of the outside of Messrs. So-and-So's diathermy or short-wave apparatus teaches nothing. Every illustration in a book of this kind should impart definite information, either on the physical side or on that of technique. In the chapter on the results of accidents during electrotherapy there should be careful and detailed suggestions for treatment, especially for diathermy burns. Dr. Kovacs emphasizes that prevention is better than cure, but even in highly skilled hands burns do occur, and help from the experience of such an expert as the author of this book would be valuable and comforting. His electromagnetic spectrum table on page 414 is good, but could be improved by making it possible for the student to appreciate more readily the relationship between Angstrom units, which he does not understand, and centimetres, which he does. On pages 493 and 494 Dr. Kovacs's references to the Finsen treatment need revision; he appears to be unaware of the great advance made in the treatment of lupus by the introduction of the Finsen-Lomholt lamp. The book remains, however, an indispensable standby for all who employ the standard currents and methods of electrotherapy and light.

Notes on Books

Though the medical profession and the public are far more conscious than they were of the nurse as a human being and a valuable member of society, few of those who have not been through the mill have much idea of the details of her daily life: of the incidents of her training or of the job for which she is trained. *Through a Ward Window* by H. L. MONTGOMERIE (Chapman and Hall, 8s. 6d.) is the work of a nurse who trained at an easily recognizable London hospital, and it is written with real humour, sympathy, and imagination in the form of letters from the heroine to her best friend. Those who deprecate the use of this device may be assured that it is very suitable to the somewhat fragmentary narrative that such a book is bound to be. The best thing in the story is the waylaying and hair-combing of the senior honorary surgeon by the probationer who mistakes him for a newly admitted patient. The reader will not only be anxious to read to the end but at the end will really know something about what life means to the probationer nurse. It can be specially recommended to girls or their parents who are anxious to know what they are in for.

British Periodicals of Medicine: a chronological list by Mr. W. R. LEFANU, Librarian of the Royal College of Surgeons of England, has appeared in two parts in the *Bulletin of the Institute of the History of Medicine*, Johns Hopkins University, and is now reprinted in book form by the Johns Hopkins Press, Baltimore, at $1.25. Part I attempts a survey of medical periodicals issued in all British lands from the seventeenth century to the end of the nineteenth, including those which continued into the twentieth but began publication before 1900. Part II gives a list of the periodicals which began publication during the present century. At the end of each part is an alphabetical index of titles. In all there are more than 1,360 separate items, each being arranged in chronological order under its earliest year date. For every item Mr. LeFanu has tried to indicate at least one library where a copy of the journal is filed; failing this he states the source of his information. In his preface he notes the "large infant mortality" among journals devoted to medicine and its specialties.

A Textbook of Histology for Medical Students by Dr. EVELYN E. HEWER (Heinemann, 15s.) is, as the author states, primarily written for the use of medical students, and in this respect admirably fulfills its purpose. It consists of a straightforward description of the essentials of human histology, and serves as a brief but authoritative

introduction to the subject from the purely medical standpoint. Where necessary, allusions are made to the bearing that the matter under consideration has upon general pathology: for example, the repair of fractured bone or the after-effects of injury to the nerve tissues. The author has wisely refrained from entering into any controversial questions, and, while giving the usually accepted or orthodox view, refers the reader, in cases where there are differences of interpretation of microscopical appearances, to special treatises for further information. The illustrations, three hundred and forty in number, are of two types—(1) photomicrographs, showing the general structure of the tissues or organs under a low power of magnification, many of which are excellent and form a valuable record of the specimens selected, and (2) rough diagrammatic sketches indicating the principal features of the individual cell elements under high magnification. The book contains a large amount of useful information, much of which is quite recent, and it constitutes a valuable guide to the study of one of the most fundamental subjects of the medical curriculum.

The Pharmaceutical Pocket Book (thirteenth edition) is published by direction of the Council of the Pharmaceutical Society and has been prepared by the Codex Revision Committee of that society (London: The Pharmaceutical Press, 1938, 5s., postage 6d). A considerable proportion of the volume is in the form of tables, which provide a wide variety of information of importance to pharmacists —for example, doses, *B.P.* formulae in Imperial system, solubilities, etc. It also contains much information of interest to medical practitioners which is not readily obtained elsewhere—for example, a dictionary of synonyms and trade names, an account of the Poisons Law and Rules. Sections of the volume deal with subjects of general physiological interest. Thus there are articles on the vitamins and on the endocrine organs; though relatively brief, these give the essential information. A high standard of accuracy is maintained throughout the volume, and it provides a surprisingly large amount of varied information for the moderate price of 5s.

Preparations and Appliances

A SIMPLE AMBULATORY METHOD OF TREATING FRACTURED CLAVICLE

Dr. Montague Dixon (Melton Mowbray) writes: The following is an account of a simple and inexpensive method of treating fractured clavicle, with apparatus that is always easily available.

Material required: novocain 2 per cent., and a 20-c.cm. Record syringe; zinc oxide strapping, two inches wide; some fine string; a packing needle; a three-inch elastoplast bandage; a six-inch bandage; Gamgee tissue; talc powder.

1. Inject the haematoma at the fracture with the 2 per cent. novocain solution to procure analgesia and resulting relaxation.

2. Measure the vertical sagittal circumference of the shoulder round the axilla, opposite the coracoid process. Let this measurement be called x inches. Cut four strips of the two-inch strapping $x + 6$ inches long to make two double strips of plaster, one for each of the two rings required. Each of these strips will have one surface sticky. Place them on the table sticky side uppermost. Cut four further strips, two to be four inches less than half the length of the double strips and two to be two inches less than this length. Place the longer of these, in each case, at the end of the double strip to eliminate the sticky part by putting sticky portion to sticky; and the shorter of them four inches from this longer one, to reach to two inches from the other end. The resulting strips will be threefold except where their surfaces are sticky, uncovered by the final strips, the sticky parts being a median portion four inches long and a terminal portion two inches long, indicated by the shaded areas in Fig. 1.

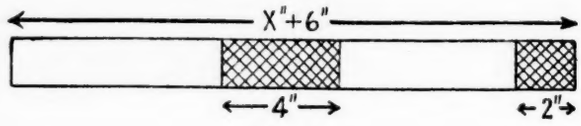

Fig. 1.

3. Make two circular rings of these strips by bringing the ends together, the terminal sticky two inches being applied to the other end of the strip. This junction should be fortified by stitching the ends together by means of the fine string and the packing needle. A quadrilateral stitch, four holes being made, will suffice (Fig. 2).

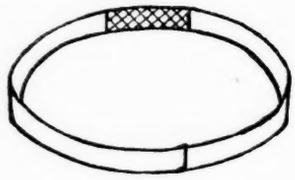

Fig. 2.

4. Cut twelve pieces of the strapping, each four inches long; take six of them to make a pad for each shoulder, six layers thick, which should be placed over the coracoid tip vertically in front of the outer fragment of the clavicle, to take the pressure of the ring (Fig. 3).

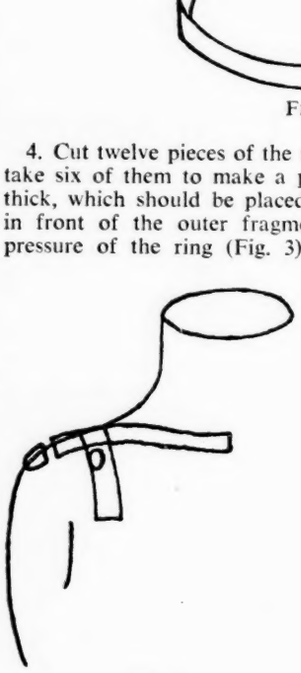

Fig. 3.

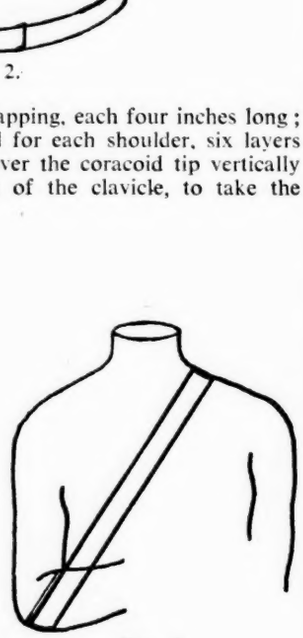

Fig. 4.

5. Now place the rings over the shoulders, and pull the shoulders outwards and backwards to reduce the overlap of the fragments, fastening the rings towards each other by the six-inch bandage, which should be tied in a bow for future adjustment. The rings will have been so applied that the sticky middle portions rest upon the six-layer pads. When the rings are tied the axilla should be liberally powdered to prevent the hairs sticking and dragging; it is better to powder as soon as the sticky middle has been accurately placed and pressed down upon the protective pads; but take care that no powder interferes with the adhesion of the sticky middle of the rings to the pads. Thus the rings will never slip during the course of the treatment.

6. Place a thick pad of folded Gamgee tissue under the knotted six-inch bandage behind.

7. It only remains to defeat the downward pull of the weight of the forequarter by means of the elastoplast bandage, which should be passed from the shoulder of the sound side to the elbow, where it holds the proximal end of the ulna, and up again to the sound shoulder; this should go twice round for firmness and strength. Fix the bandage at the elbow by additional strips of zinc oxide strapping at its edge (Fig. 4).

8. A narrow sling can be worn except when the hand is being used.

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AIR RAID CASUALTIES

We as a profession, in common with the country, pray for peace in our time. But if we are to be granted no more than a respite from war we are resolved that we shall not again be caught unprepared. In particular we are concerned with the arrangements for casualties in the event of air raids on London. For some years hospitals and their staffs have asked, and asked in vain, what would be required of them in the event of war. It was therefore with a sense of relief that the profession read, early in June this year, the Home Secretary's announcement in the House of Commons that he had appointed a committee with Sir Charles Wilson as chairman to advise on the casualty organization for London. The personnel of that committee was in itself an assurance that a workable plan would be thought out without waste of time, and it is understood that the committee did present within six weeks of its appointment an interim report to the Minister of Health containing apparently the gist of the whole matter. In drawing up its report the committee received invaluable assistance from a careful survey of the available hospital accommodation in the country made by the Ministry of Health and from the census of the profession compiled by the British Medical Association. An account of the Association's part in mobilizing medical man-power for war will be found in the *Supplement this week*. The work of the head office at Tavistock Square in this connexion has been of the greatest help in shaping a plan for dealing with personnel.

The Wilson report was, we understand, accepted by the Ministry of Health, but it has never been published, and since the committee was appointed only in an advisory capacity we have no assurance that its recommendations have been carried out. We know that certain preparations have been made by London hospitals for the reception of casualties. But it is not in the hospital arrangements that a breakdown may be anticipated. The casualties have first to be removed from the streets and taken to the nearest hospital. Is there in existence an adequate body of stretcher-bearers or is it merely a figure on paper? And have effective transport arrangements been made for taking casualties to the nearest hospital? These are the foundations of any plan, and unless they have been firmly laid the whole scheme must break down. Further, since the casualties must be removed from the danger area as soon as possible, a large number of beds in base hospitals in the home counties is necessary. Has sufficient provision been made for these outlying beds?

The advisory committee, as we have said, reported in July, and we understand that Sir Charles Wilson has paid a warm tribute to Dr. Hebb and others at the Ministry of Health who spent August and September, when others were on holiday, giving effect to the committee's recommendations. But the first secret of administration is devolution, and there is a feeling abroad that the Ministry in tackling a vast job when time was everything would have been well advised to seek more help from outside. At any rate, when the international situation deteriorated late in September the casualty organization was not ready for a war which appeared to be imminent. The hospitals were asked to prepare for the reception of casualties, and we know some of the steps that were taken in their conversion into casualty clearing stations. Some of them, such as St. Bartholomew's, St. Mary's, the Middlesex, and the London appointed a member of their staff as commandant. Preparations were rapidly made for adapting old buildings to new purposes and for the evacuation of as many of the sick as possible either to their homes or to base hospitals. But there cannot have been effective co-ordination of this effort, for when some hospitals were ready to take casualties others had scarcely begun their preparations. Moreover, the efficiency of a hospital, for whatever purpose it is used, ultimately depends on its staff, and it was everywhere found impossible to appoint a war-time staff in the absence of the necessary information about financial assistance from the central authority. The teaching hospitals, for example, cannot expect to retain their present staffs in their entirety. They will have to rely on a skeleton staff in the manner of the casualty clearing stations of the great war, the remainder of the staff being required elsewhere. In practice, some at least of this skeleton staff will probably have to devote all their time to the service of their hospital. But the hospitals are still in ignorance as to whether the State is prepared to pay salaries to these whole-time workers. Further, since the brunt of a raid may fall on some particular part of London while the rest escapes, it is necessary to organize mobile surgical teams, and so far as we know this has not yet been done.

It would not be difficult to multiply examples of the absence of adequate preparations. It is plain from the experience of the great war that medical schools ought to carry on in the event of war, but the schools do not yet know whether their students would be conscripted, if and when there is conscription. They are still in ignorance of the Government's policy, and they cannot begin to make arrangements until they know that policy. Further, when there is talk of filling the teaching hospitals entirely with casualties, they wonder how they are to train their students in the clinical years in the absence of ordinary ward material. Men returning from summer holidays report that there is scarcely a hamlet in the land without an elaborate organization for dealing with gas casualties, though the odds against a bomb, much more a gas bomb, disturbing the sylvan peace must be about one in a million. And while the depths of rural England are busy with this minute preparation, London, which must expect no such immunity, postpones the most vital preparations to the eleventh hour or later. It is idle to deny that such a lack of proportion and of horse sense is disquieting. Between two and three million civilians are to be evacuated out of London and billeted in town and village, so that in many places there will not be a vacant room. Have arrangements been made for the medical care of these refugees? Questions of that kind are on everyone's lips. Men ask, Are there enough stretchers, blankets, beds?

It is a time for plain speaking. The committee for casualty organization, announced in Parliament in June for the purpose of allaying public misgivings, and saddled in the minds of the profession with the responsibility of producing a plan which would work, was not permitted to finish its task. It has not apparently met since it presented an interim report in July. Why? If this procedure is to become the practice of Government departments difficulty will be found in persuading responsible members of the profession to come to their assistance. Out of these misgivings a moral emerges. In the great war the combatant services appointed consultants to assist in an advisory capacity. If there is unhappily to be another war London will be the front line. The arrangements for coping with casualties from air raids will concern millions of its inhabitants and a considerable fraction of the medical profession. It is unthinkable that any Government department would attempt the solution of a problem on this scale relying only on its own resources, considerable as they may be; it would certainly seek the assistance of the best brains in the medical profession. The public and the profession could be content with nothing less.

SEASONAL PERIODICITY IN MALARIA

Seasonal periodicity is a familiar phenomenon in both the vegetable and animal kingdoms. When it is remembered that the aetiological cycle of malaria involves no fewer than three animal forms —man, the mosquito, and the parasite—it is perhaps not so surprising that this disease should be almost as regular in its vernal and autumnal manifestations as the blossoming and fruiting of trees. Our knowledge of the causes of seasonal variation in malaria and the expression of this variation in an exaggerated form as epidemics is still, however, very imperfect. Explanations on accepted lines often fail to satisfy when subjected to close examination. In *The Seasonal Periodicity of Malaria and the Mechanism of the Epidemic Wave*[1] Colonel C. A. Gill deals in a very informative way with this aspect of malaria. Malaria exhibits itself under very different phases in different localities, but there is a general similarity, according to the author, in many of its features as seen in the temperate, subtropical, tropical, and equatorial zones. Thus malaria in a temperate zone represents malaria in the absence of the malignant tertian parasite and has many features due to the peculiar property of the benign tertian parasite of lying dormant and relapsing after long intervals. The spring epidemic characteristic of malaria in this zone, it is now known, takes place at a time when there are practically no anopheles and is due to the delayed effects of infection contracted in the previous autumn. Malaria in a subtropical zone is exemplified by conditions in South Italy. There are two epidemic periods, one in the spring and another, the more important, in the autumn. The delayed primary attack of benign tertian, so conspicuous in Holland, is here less common and most of the spring cases are relapses in persons who have already suffered in the previous autumn from an actual attack of fever. Further, where the mean temperature during the hottest months is not less than 20° C. (for example, South Italy) manifestations of malignant tertian give special features to the autumnal rise. Tropical zone malaria is very similar in its general features to the last-mentioned type, but differs in the great intensity of the autumn effects as shown by morbidity and mortality and also by the fact that, whereas in subtropical zone malaria the determining factor is mainly temperature, in tropical zone malaria it is humidity (rainfall). Equatorial zone malaria, again, shows spring and autumn periodicity, but here both epidemic periods are of equal amplitude, and instead of rainfall drought is the chief determining factor. The distribution of these different epidemiological

[1] London: J. and A. Churchill. 1938. 10s. 6d.

types of malaria, their distinctive characteristics, and the mechanism of the epidemics associated with them, so far as known, are clearly set out with some very good illustrative charts and a map of the world giving the limits of the zones. An extremely interesting and instructive analysis is given of the European types of seasonal prevalence which has been made possible by the very thorough researches carried out more especially in Holland and Italy. The characteristic features of the North Indian type of epidemic and the Ceylon epidemic are also closely studied. The most puzzling problem with which Colonel Gill has to deal is one that has already been prominently brought forward in discussions relating to the last-mentioned epidemic—namely, the nature of the mechanism by which malignant tertian malaria becomes so rapidly prevalent at the beginning of an epidemic. Practically all authors agree in regarding malignant tertian malaria as not exhibiting the long relapse seen in benign tertian malaria, and we have ample evidence that in the beginning of such epidemics there is very little infection in the form of gametocyte carriers to explain the remarkably rapid rise of infection with its resulting morbidity and mortality. Colonel Gill puts forward the view, for which he gives certain evidence, that the seasonal epidemic wave, even with malignant tertian, is initiated by a seasonal wave of relapses. He thus hypothecates that there is some cause at present unknown bringing about such a seasonal wave of relapses. In a short appendix he clearly tabulates the mean monthly figures for temperature and humidity of a number of selected localities in the different malaria zones which should be very useful for reference. Even though his conclusions may not always be accepted, the very clear exposition of what is at present known regarding seasonal effects in malaria and the mechanism of epidemics makes the book one that every malariologist should read.

SUDDEN "EXHAUSTIVE" DEATH IN EXCITED PATIENTS

Shulack[1] has recently drawn attention to a problem which has puzzled psychiatrists for a long time, and has been the subject of a number of recent German publications. Young and healthy persons suddenly fall ill with a grave psychosis having as its main symptoms extreme motor excitement, aggressiveness, and a tendency to ruthless self-destruction (for example, by self-castration, bashing the head against the wall, etc.). The excitement resists all treatment by sedatives, of which only restricted use can be made because of the rapidly appearing disturbances of circulation. There is often a short rise in temperature, and after a few days the psychosis ends fatally. The impression is often gained that the patient dies of exhaustion due to continuous struggling and excitement. The post-mortem findings offer no explanation for the malignant course, and no definite cause of death is found. Shulack collected 364 cases of this kind from the literature, adding twelve of his own. Stefan[2] collected 148 patients, and Stauder[3] twenty-seven from the Munich Psychiatric Clinic. This, however, gives an exaggerated idea of the frequency of this syndrome; Scheidegger[4] was only able to collect forty-three cases from the records of twenty-eight years in the Zurich Clinic. Whereas the German papers are well documented with post-mortem findings, a necropsy was carried out in only two of Shulack's cases. Examination of the histological findings in the brain is indispensable for excluding barbituric poisoning as a cause of death. All kinds of sedatives, especially scopolamine, are extensively used in severe excitement, and their combination with exhaustion, refusal of drink and food, and psychomotor excitement provides a most obvious, though as yet unsubstantiated, explanation of the fatal course. Swelling of the brain, hyperplasia of the thymus and other endocrine anomalies, and under-development of the whole circulatory system have all been found in individual cases. Jahn and Greving[5] found erythropoiesis in the marrow of the femur and other signs of accelerated new formation of the red blood cells in five cases, and drew a parallel between these findings and the effect of histamine poisoning in animals. According to Scheid[6] these findings also are not of general application. All ordinary physical explanations, therefore, are as yet premature; and one is faced by the question whether death can be directly caused by the emotions. In this connexion Shulack suggests that the vegetative centres in the hypothalamus and the vital centres of the medulla may be the seat of a disturbance of unknown nature or the point of attack of a hypothetical toxic substance. No pathological changes have, however, been found in these regions. Most of the authors regard their cases as schizophrenic, though Derby[7] speaks also of manic-depressive psychoses taking this course. Stauder thinks these cases constitute a special clinical group of "fatal catatonia," and thus revives under a new name the "delirium acutum" of the psychiatry of last century. Scheid, on the other hand, considers them pronounced examples of the schizophrenic illness in which the bodily symptoms otherwise are latent and difficult to assess. He describes similar "febrile cyanotic episodes" as transient phases in schizophrenia, and regards them as critical states comparable to coma in diabetes. It is difficult to see how the ambiguous and obscure pathological changes found in these acute psychoses can be of any help in investigating the pathology of schizophrenia, but there is always the temptation in medicine to explain the unknown by the unknown.

[1] *Psychiat. Quart.*, 1938, **12**, 282.

[2] *Z. ges. Neurol. Psychiat.*, 1935, **152**, 480.

[3] *Arch. Psychiat.*, 1934, **102**, 614.

[4] *Z. ges. Neurol. Psychiat.*, 1929, **120**, 587.

[5] *Arch. Psychiat.*, 1936, **105**, 105.

[6] *Febrile Episoden bei schizophrenen Psychosen*, Leipzig, 1937.

[7] *Psychiat. Quart.*, 1933, **7**, 436.

DURATION OF IMMUNITY AFTER DIPHTHERIA PROPHYLAXIS

The degree and duration of immunity produced by any form of preventive vaccination can be measured either by estimating antitoxins or other antibodies circulating in the blood of the vaccinated person or by determining whether the expected incidence of the specific diseases among the vaccinated individuals is reduced during a short or long period following immunization. In estimating the protection conferred by immunization against diphtheria the first of these methods has served well. The second method has been mostly used in the case of small-pox, and among people who are constantly exposed to the chance of infection with small-pox it is the custom in some places to vaccinate in infancy and revaccinate perhaps on two occasions, at seven and fourteen years after the first inoculation. Is there any need for periodic revaccination against diphtheria? The question has been asked many times, and has been discussed by Parish and Wright.[1] S. Frant[2] has shown that in New York, where immunization has been employed on a very large scale during recent years, the proportion of cases of diphtheria in patients over 15 years of age has increased, though a substantial number of these patients had been inoculated earlier in life. It is not clear that all the children had been tested after inoculation and proved to be negative to the Schick test, but probably this assumption is near the truth. Dr. Frant has suggested that children should be actively immunized in the first year of life and subsequently Schick-tested, a second Schick test being undertaken three years later, apparently just before the child goes to school. If this second test gives a positive result, his suggestion is that one further dose of prophylactic should be administered. D. T. Fraser[3] made a somewhat similar proposal in 1936. The ideal policy would be immunization in infancy with periodic tests every four or five years, but this would be troublesome and would almost certainly prove impracticable. Most doctors would steer a middle course between the present practice of one immunization against diphtheria in infancy and periodic revaccination, as is customary against typhoid fever or small-pox. A child who has once been vaccinated against diphtheria has, even after he may have reverted to the Schick-positive condition some years later, a vivid "potential" immunity, and will quickly become Schick-negative again after the injection of one dose of prophylactic or after a subclinical infection. As Chesney and others have shown, the injection of two doses of potent alum toxoid, separated by a proper interval, produces the Schick-negative condition in virtually all children injected; thus the Schick test—except for purposes of research and periodic control—might well be omitted when this antigen is used. This would reduce the work of the administrator considerably, and the saving of a visit by the mother and child at this stage might well make them more responsive to the suggestion that it would be a simple form of insurance to bring the child again for one injection of prophylactic just before starting school life, with its greater risk of exposure. Where some such policy is not adopted the medical officer of health, if there is evidence that a severe wave of infection is occurring locally, as part of his immunization scheme should consider urging the injection of one dose of prophylactic in the case of all children who have been immunized in infancy.

[1] *Lancet*, 1938, **1**, 882.
[2] *Quart. Bull. Dept. Hlth. N.Y.*, May, 1938, 56.
[3] *Canad. publ. Hlth. J.*, 1936, **27**, 597.

SULPHANILAMIDE AND SERUM

Most of the infections amenable to the action of sulphanilamide were previously treated with serum. Where serum treatment was always of doubtful value, as in the majority of streptococcal infections, it has already been almost forgotten; on the other hand, in some types of pneumonia and in meningococcal meningitis, where the efficacy of serum treatment was fully established, it has now become an important question whether chemotherapy is merely to reinforce or completely to supersede it. There is both experimental and clinical evidence that the two treatments combined are more effective than either alone. This is to be expected, but it does not follow that both should be employed in favourable cases; if one specific remedy will serve it is a mistake to employ two, especially if the second is expensive, difficult to administer, and apt to cause unpleasant after-effects. In severe and desperate cases every available therapeutic weapon should be brought to bear, and what this may achieve is well illustrated in a report by M. Finland, J. W. Brown, and A. E. Rauh[1] on ten patients with pneumococcal meningitis treated with both sulphanilamide and serum, of whom six recovered. It seems to be beyond question that 2-(*p*-aminobenzenesulphonamido)pyridine ("M and B 693") is much more effective in pneumococcal infections than is sulphanilamide, and it is arguable that favourable cases of pneumonia may justifiably be treated with this drug without resort to serum. The contrary attitude to this has recently been voiced in this *Journal* by Fleming,[2] who has also[3] published evidence based on *in vitro* experiments that the combined action of this drug and of serum is greater than that of either alone. A further plea for combined serum and chemotherapy is now made by E. E. Osgood[4] on somewhat similar grounds. Osgood has previously advocated the use of a bone-marrow culture medium for studying chemotherapeutic action on streptococci, and he has now employed this method for the pneumococcus. What his experiments show is that the growth of this organism is suppressed to a greater degree in this medium by anti-pneumococcal serum and sulphanilamide together than by either acting separately. These, and more particularly some further experiments in broth, would carry more conviction were it stated that the serum used contained no preservative. These experiments raise another question of wider interest. Their object is to imitate as

[1] *New Engl. J. Med.*, 1938, **218**, 1033.
[2] *British Medical Journal*, 1938, **2**, 37.
[3] *Lancet*, 1938, **2**, 74.
[4] *Arch. intern. Med.*, 1938, **72**, 181.

far as possible *in vitro* the conditions which obtain in the body, the test mixture containing not only the therapeutic agent under investigation, a suitable nutritive fluid, and bacteria, but living leucocytes. Similar conditions are secured by the "slide-cell" method employed by Fleming, in which drug or antiseptic in different dilutions and bacteria are mixed with fresh blood. If the results obtainable by these proceedings are valid, as they doubtless are in principle, it is desirable that a standard method of this kind should come into more general use.

IDENTICAL CANCERS IN IDENTICAL TWINS

An interesting addition to the records of cancer in identical twins is reported from the Mayo Clinic by Phillips.[1] One twin had a carcinoma in the right breast in 1927 and another carcinoma in the left breast eight months later. The other twin had a lump in the right breast for which a simple mastectomy was performed; in 1932 there was a recurrent carcinoma on the right side and another carcinoma was present in the left breast. Radical operations were performed on both twins, who are now well and apparently free from cancer of the breast. In 1937, however, the first-mentioned twin developed bilateral papillary adenocarcinomata of the ovaries. Will ovarian cancers develop in the other twin? The immediate problem for the surgeon is to decide what should be done to safeguard the second twin. Phillips suggests prophylactic oophorectomy or deep *x*-ray treatment, but does not feel justified in advising hysterectomy. Usually, if a cancer develops in one of a pair of identical twins, the other twin has a cancer of the same type in the corresponding organ, either at the same time or soon afterwards, but Phillips quotes a case of Kaplan's in which carcinoma of the breast had not been reproduced in an identical twin after six years. In the future drastic preventive measures may be advised without hesitation; the accumulation of carefully observed instances will supply the guide.

FATALITY RATES IN TUBERCULOSIS

In an interesting analysis of the present trend of case fatality rates in tuberculosis[2] Drolet shows that the ratio of deaths to new cases of tuberculosis reported in various communities has varied little in the past twenty years, a period during which the incidence and mortality of the disease have been declining steadily. Similarly, no variation was found in this ratio when it was calculated on the basis of the new cases reported and the survivors two years after notification, the period during which most of the deaths occur. Since the ratio of deaths to cases is comparatively high in children under 5, low in the age-period 5 to 15, and then rises steadily with age, the possible influence of a change in the age distribution of the populations had to be eliminated. Drolet shows that the differences between the age of patients or age at death now and formerly are not great enough to modify materially the fatality rates of the communities investigated. Persons dying from tuberculosis now are, on an average, slightly older than formerly. Passing to the influence of treatment on the fatality rates, Drolet finds that the mortality ratio to the total discharges among cases treated in sanatorium or hospital since 1910 has tended to fall in New York. In England, on the other hand, the mortality ratio in "approved residential institutions" was 11 per cent. in 1927, and has risen steadily to 19 in 1936. The proportion of all tuberculosis cases "isolated" in hospitals is several times greater now than it was some time ago: in the United States it has risen from 4 per cent. in 1915 to 25 in 1934; and in England, from 8 per cent. in 1921 to 17 in 1934. This he considers the most important factor in the fall in the tuberculosis mortality. Finally, Drolet says that sanatorium or surgical treatment of pulmonary tuberculosis would seem so far to have had little effect upon the case fatality rates of the entire tuberculous population in the communities he has studied. But this finding in regard to the surgical treatment (including artificial pneumothorax) of pulmonary tuberculosis in no way detracts from the value of collapse therapy, for correctly applied collapse therapy is still too recent a measure to allow of the study of its influence on case fatality.

[1] *Proc. Mayo Clin.*, 1938, **13**, 209.
[2] *Amer. Rev. Tuberc.*, 1938, **37**, 125.

THE MEDICAL REGISTER: UNTRACEABLE PRACTITIONERS

We publish in the *Supplement* this week, at the request of the General Medical Council, a list of the names of those medical practitioners who have not replied to the Council's inquiries as to the accuracy of their postal addresses. Any practitioner, wherever resident, whose name is included in this list should communicate at once with the Registrar of the General Medical Council, 44, Hallam Street, Portland Place, W.1, or, if originally registered in Scotland, with the Registrar of the Scottish Branch Council, 44, Queen Street, Edinburgh, 2.

The second W. E. Dixon Memorial Lecture will be delivered by Sir Frederick Banting, F.R.S., in the Barnes Hall of the Royal Society of Medicine, 1, Wimpole Street, W., at a meeting of the Section of Therapeutics and Pharmacology on Tuesday, October 11, at 5 p.m. The subject of his lecture is "The Immunity Aspect of the Tumour Problem."

The Harveian Oration before the Royal College of Physicians of London will be delivered on St. Luke's Day, Tuesday, October 18, at 4 p.m., by Sir Edward Mellanby, M.D., F.R.S., whose subject is "The State and Medical Research."

SURGICAL PROCEDURES IN GENERAL PRACTICE

This is one of a series of articles contributed by invitation

INFECTIONS OF THE HAND AND FINGERS—II

BY

NORMAN C. LAKE, D.Sc., M.D., M.S., F.R.C.S.

Mode of Infection

Infection may reach the fingers and hand in many ways. The most obvious and important is by penetrating and lacerated wounds, especially those produced by the prick of needle or pin or other sharp-pointed instrument. The reason why penetrating wounds of this type appear to be more prone to the development of infection than others is probably because the organisms are implanted along the long narrow track through which the natural flushing of protective serum and exudates is impossible. There can be little doubt that a large number of organisms are mechanically removed during the penetration of the tough superficial layers of the skin, especially on the volar aspect, otherwise infection would be even more frequent. Extensive lacerated and incised wounds of the hand, too, are probably more likely to lead to infection than in many other regions of the body. This may be due to the fact that many of the divided structures retract well away from the wound, and so carry organisms into parts which are neither flushed by the natural transudation of lymph nor easily reached by such primary antiseptic measures as may be used.

The second mode of origin of infection is from small superficial skin lesions, especially around the nails. In particular a "hang-nail" is a common portal of entry. Dermatological lesions of the skin also may form the primary source of infection, and these, of course, not infrequently prove to be of vocational origin. The question of blood-borne infection of the fingers and hand is a moot one, since minute portals of entry can so easily be overlooked. There are, however, exceptional cases in which it appears beyond doubt that the infection reached the part from some other focus via the blood stream. In all cases of apparently spontaneous infection the suspicion must arise of an underlying constitutional condition, such as diabetes, or of a pyaemia. These suspicions must obviously be confirmed or confuted before any surgical means of treatment are entertained.

Spread of Infection

It will be readily recognized that infection of one part or tissue may arise by spread from another; thus infections of the palmar spaces often follow a primary infection in the finger. In many instances this spread is a continuous one, the infection extending along the subcutaneous tissues or in the thecal sheaths, which latter may subsequently burst at their proximal ends into the cellular tissues of the palm. It is because extension of this type tends to be, at least temporarily, controlled by certain anatomical features that so much attention has been paid to these in the previous section. In other cases the spread is a discontinuous one. Here the organisms travel from the fingers along the lymphatic spaces or vessels, are arrested in the palm, or even higher, and there set up a new zone of infection. Spread may occur distally as well as proximally; the classic "Kanavel hand" arises when deep palmar suppuration extends distally along the lumbricales to the web spaces, there to discharge spontaneously through multiple sinuses.

Sometimes infection is complicated by the retention of foreign material in the wound; in these circumstances its detection and removal may constitute an important part of the treatment. Metallic foreign bodies are obviously easily displayed and localized by radiography. Cloth, leather, etc., can only be discovered by thorough exploration of the wound. A very common foreign body is glass: the coarser varieties contain enough lead and other heavy materials to render them more opaque than the body tissues to the rays, but the finer varieties may give such a poor shadow as to be easily missed. Wood, another common foreign body, is as easily penetrated by the rays as the body tissues, and therefore cannot easily be detected by this means. Luckily, splinters of wood often have a coating of paint or other opaque material, which aids greatly in their detection.

Infections arising from injury may also be complicated by lesions of tendons, nerves, vessels, or other bones. Such complications must be recognized in the early stages, since they may necessitate considerable modification of the treatment otherwise proper to the case.

Chronic Infections

Chronic infections of the hand fall outside the scope of this article, but as they may enter into the question of differential diagnosis it is necessary to state here the chief ways in which chronic infections manifest themselves. In syphilis the primary chancre may appear on the finger-tip, especially in dentists, doctors, nurses, and others having to deal with these cases. The palm of the hand is a common site for the appearance of the secondary rashes, but as these are always bilateral they rarely occasion mistakes. Tertiary lesions in this situation are exceedingly rare, but gummata arising in the periosteum of the bones and even from the soft tissues have been recorded.

Tuberculosis may affect the hands in three chief ways. The skin may be the seat of a local tuberculous process due to direct implantation of the organisms in surgeons, pathologists, and the like. This gives rise to the well-known verruca necrogenica. In children a tuberculous osteitis of the metacarpals or phalanges produces the so-called tuberculous dactylitis (spina ventosa). The diagnosis of this condition is confirmed by radiography, an unusual feature being the laying down of fresh bone under the periosteum, even in the absence of a secondary infection. In later life tuberculous infection of the palmar bursa may arise.

In this the exudation distends the whole palmar sheath, and so appears as an hour-glass swelling, partly distal and partly proximal to the annular ligament, giving through fluctuation. In this variety of tuberculous tenosynovitis the production of numerous "melon-seed" ("rice") bodies is usual.

Other chronic infections have been known to appear in the hands, but their incidence is so rare that they can be ignored.

Diagnosis

The diagnosis of infection of the hand and fingers is usually self-obvious. The determination of its site and anatomical localization, however, is much more difficult and of far greater importance. It has already been pointed out that the position of maximum swelling is not necessarily a guide to the location of the infection. Thus in inflammation of the palmar and thenar spaces the maximum swelling is always seen in the dorsum of the hand. The position of maximum tenderness is of greater value, but even this gives no indication of the depth of the infection. In the more superficial infections—that is, subcuticular, subcutaneous, or subungual whitlow—the limits of the infection are usually clear. When the thecae are involved there is swelling corresponding to the anatomical limits of the particular sheath involved, and there will be pain upon all movements of the digit, both active and passive. It is extremely important to note the range of movement over which pain is elicited, for pain upon movement in one direction only may arise when the infection lies outside the sheath if the inflamed part is compressed by the movement. In these cases, however, movement in the opposite direction usually brings relief, which of course is not the case when the theca is involved. Inflammation in a joint, too, may give rise to pain on all movements, but here the localization of the swelling to the vicinity of the joint enables the distinction to be made. In this instance pressure along the longitudinal axis of the digit is painful, whereas this is practically painless when the theca only is involved. End pressure upon the nail elicits local pain in the case of onychia or when the terminal phalanx is affected. Suppuration in the nail bed can often be seen through the translucent substance of the nail: a greenish-yellow area indicates the site of the pus.

Infections of the palmar and thenar spaces produce a fullness of the corresponding site of the palm, with obliteration of the normal hollow (cup of the palm) and local tenderness. If the anatomical limitations of these spaces be remembered there will be little difficulty in detecting which space is involved, but in addition the situation of the swelling in the web spaces and on the dorsum of the hand will afford corroborative evidence. The inner three web spaces are affected when the palmar space is involved, the first web space and sometimes the second when the thenar space is involved. If the thecae are not also infected a limited degree of movement of the fingers is possible without pain.

Infection of the palmar bursa (common flexor sheath) also causes fullness in the palm, best marked on the ulnar side. This can be distinguished from infection of the areolar space by noting that the swelling extends above the annular ligament, and that the movements of all the fingers are extremely limited and painful in the early stages. A swelling proximal to the annular ligament may be due to infection of the deep space of the forearm by extension from the palmar space. This is distinguished from a bursal swelling by the fact that it is less well defined and arises at a later stage of the disease when the palm is already extensively involved.

To complete the examination a search must be made for the presence of lymphadenitis in the axillary glands, rarely in the epitrochlear also, and for lymphangitis. The superficial lymphatic vessels for the most part travel in a spiral fashion, passing from below upwards and inwards around the forearm. The red, tender, and indurated streaks of a lymphangitis follow this course.

Finally, the general condition of the patient must not be overlooked. The extent of increase of temperature and pulse and the occurrence of rigors are all important diagnostic features.

Pre-operative Considerations

The foregoing section has dealt with the anatomical limitations of an infection, but before rational treatment can be undertaken it is necessary, in addition, to form a conception of the type and virulence of the infecting organisms: the conduct of the case will depend upon this as well as upon anatomical considerations. The organisms most commonly found are, of course, staphylococci, streptococci, and more rarely *B. coli*. Of the former the *aureus* variety has a special virulence which may approach that of many streptococcal infections; it may produce a lymphangitis not unlike that of a streptococcus. The well-known predilection of this organism for bone will naturally arouse a suspicion of some bone involvement, but in the hand this distinction is of less importance than it would be in many other regions. A lymphangitis can, however, usually be accepted as evidence of a streptococcal infection, especially if it be associated with a widespread infection which displays little tendency to localization or suppuration, if the patient develops rigors, or if his general condition appears to be unduly bad in proportion to the extent of the lesion. Sometimes, when a wound is already present, the actual organism may be identified by bacteriological examination, and when possible this should be done. Frequently, however, the nature of the infection has to be decided from clinical observation only. In the presence of lymphangitis, lymphadenitis, high temperature, and rigors the infection may be assumed to be a streptococcal one and treatment instituted accordingly. If involvement of bones or joints is suspected, a skiagram should be taken before the diagnosis is considered complete. A similar precaution should also be observed when the possibility of a foreign body arises. In the case of lacerated wounds a careful search must be made for evidence of damage to nerves or large blood vessels.

It cannot be too strongly urged that the preliminary examination should be thorough, for only in this way can a complete picture be formed that will enable one to deal with the case efficiently. It has already been remarked how important the hand is from the economic point of view; if the maximum of function is to be retained in an infected hand there must be no hurried surgical intervention before the case has been studied completely.

It has for long been customary to classify whitlows into subcuticular, subcutaneous, subperiosteal, subungual, and thecal, but, although this subdivision has its virtues, it conveys an idea of detachment that is quite alien to the general tendency to spread from one structure to another which these infections display. Such a detached pathology is apt to lull one into an unjustified sense of security, which may cause delay in the recognition of important extensions and so produce tragic results.

Treatment

The treatment of these cases depends upon the localization and the nature of the infecting organism. The general principle of rest to an acutely inflamed part, however, is applied to all, whether operative treatment is necessary or not. Rest tends to limit the spread of the infection, and is particularly useful when the thecae are threatened or involved. It is achieved by appropriate splinting. Often the best form of splint to use is that

constructed of stout wire bent by the surgeon to suit the individual requirements of the case while allowing the necessary dressings, baths, etc., to be carried out without disturbance. There is no need here to detail the construction of these splints: their efficacy is often a measure of the mechanical ingenuity of the doctor. In some instances plaster slabs may be moulded to immobilize larger parts; they, too, must be applied in such a way as to allow the dressing to be carried out without movement of the joints or tendons.

If the suspicion arises that the case is due to infection with a streptococcus, special caution is necessary in its conduct. Owing to the fact that violent streptococcal infections, here as elsewhere, are associated with some degree of septicaemia in the earlier stages, and that there is little tendency to localization, operative treatment, with certain exceptions to be mentioned later, should be avoided. The old idea of making multiple incisions into the infected areas "to relieve tension" has little to recommend it, and may be definitely harmful by helping to spread the infection and breaking through any resisting barrier which may be forming. In the initial stages the treatment of such cases may be along general lines. The recent introduction of drugs of the sulphonamide group has placed in our hands a potent weapon for dealing with streptococcal infections. Since, in reasonable dosage, they appear to be devoid of any serious untoward effects, their use is justified in suspected cases, even before the nature of the organism has been definitely proved. The original materials, given by injection, have been largely supplanted by others for oral administration. Prontosil, proseptasine, streptocide, etc., may all be given in 7½-grain doses four times a day. Sulphaemoglobinaemia and albuminuria have both been reported following the use of these drugs, but the special precautions to be taken will be considered in a future article in this series. Antitoxic streptococcal sera are also of proved value in these streptococcal cases, and should be used when other means fail to arrest spread. Lymphangitis and lymphadenitis are similarly dealt with. If the infection is a very superficial one (erysipelas) it may be reached by ultra-violet irradiation, which has a definite limiting effect and is of considerable value.

The rule that streptococcal infections are not to be treated by operation is subject to two important exceptions. If the vitality of a digit is threatened by the extreme tension of the exudate, which is obviously interfering seriously with the blood supply, some small incisions into the subcutaneous tissues are proper in an attempt to reduce the tension and so save the finger. In cases of this type the simultaneous administration of the sulphonamides is advisable to avoid blood-stream infection. The second indication for operation arises in the later stages, when frank suppuration has occurred. The appearance of localized pus in a streptococcal case is a sign that the patient's resistance is dealing adequately with the infection, and in these circumstances drainage may be instituted as for other infections.

With these important exceptions infection of the hand and fingers should receive energetic surgical treatment in as early a stage as possible. Damage may be done both by delay and by too vigorous and extensive initial treatment, but there can be no doubt that the commoner errors are those of delayed and timid surgery. An early infection is sometimes dealt with by a minute incision under an ethyl chloride spray which lets out a bead of pus but fails to arrest spread at the periphery. The surgeon probably thinks that a larger incision will take a long time to heal, forgetting that a widespread infection, inadequately treated, will take much longer still and may lead to great disability. These cases must be attacked in no half-hearted way; but as a corollary to this it is most important that the surgeon should have a clear idea of the aim of the operation and of the anatomy of the parts, so that he may design his incisions to produce proper drainage without endangering any important structures, spreading infection, or producing disability by his very procedure. Every case must be carefully worked out on its merits, but there are certain general rules which form a valuable guide in the majority of instances. It must be stressed that all operations of this type should be performed deliberately under full general anaesthesia, with good illumination, and, preferably, in a properly equipped operating theatre. To attempt to drain an infected hand or finger, other than a very superficial infection, in the surgery or the casualty ward under a short gas anaesthesia is courting disaster. Local anaesthesia is not usually suitable for these cases, with perhaps the exception of the terminal phalanx, where regional anaesthesia may be produced by circumferential infiltration at the base of the digit. The use of the ethyl chloride spray, even for fairly superficial infections, is not to be recommended: the local freezing devitalizes the parts and facilitates the spread of infection. Gas-and-oxygen or evipan anaesthesia is quite adequate for these cases, and should supplant all local measures.

A tourniquet should be used only with the greatest of reluctance for fear of devitalizing tissues; if it is employed at all it should remain on for a short time only, and in no circumstances should Esmarch's bandage be applied.

(To be continued)

MEDICAL DEFENCE UNION

At the annual meeting of the Medical Defence Union, held on September 27, it was announced that during the year 1,627 new members had been elected, and that in July last the total membership stood at 21,231. The number of cases handled during the year was 1,814. The investments now amount, at market value, to over £102,000.

The Matrimonial Causes Act

One matter to which the Council of the Union has given careful consideration during the year has been the application of the Matrimonial Causes Act, 1937. The Council aligns itself with the British Medical Association in the view that when a practitioner is approached for an opinion by a declared prospective petitioner as to the incurability of the mental condition of the respondent or as to a medical condition existing at the time of marriage, he would be well advised to decline to express such an opinion, except at the direction of the court, or to a guardian *ad litem* if appointed, though he might conceivably place his records of the case at the disposal of an independent medical expert nominated by the petitioner or by his authorized legal adviser. It is anticipated that there will be developments affording practitioners a fuller degree of protection than they now possess and permitting the proper operation of the Act without the risk of an action for defamation being brought against the practitioner. One suggestion is the establishment of a panel of medical examiners, as at present in nullity suits. Another is that Section 16 of the Mental Treatment Act, 1930, should be applied to preclude any person starting an action against a certifying practitioner until the court is satisfied there is substantial ground for his contention.

Allegations of Negligence

The annual report includes a useful series of typical cases dealt with during the year. It illustrates incidentally the

variety of methods adopted by patients when they want to evade payment of a doctor's account. One of the most common is to quote another doctor's diagnosis as evidence of improper diagnosis and treatment. Of the 184 cases handed over to the Union's solicitors (Messrs. Hempsons) to be dealt with, about half involved charges of negligence, the majority of these being raised by way of set-off or counterclaim, but in no case did the set-off or counterclaim succeed. In one or two cases actions have been threatened on the ground of complications following an operation, after which there had been non-absorption of a stitch. The Council has always felt that this is a matter for which the surgeon cannot in any way be held responsible, as it is due to a defect in the material which he cannot anticipate.

Unauthorized Examinations

An unauthorized operation, save in an emergency, or even an examination may constitute an assault in law, and members of the Union are advised to make sure when instructed to examine a patient on behalf of a third party that the person to be examined is fully aware of the circumstances and that they have his permission to examine him and to report to the person on whose behalf the examination is made. A case is related in which action was threatened against a practitioner who carried out the examination of a man without his sanction. The practitioner was medical officer to a football team and was instructed on behalf of the management to examine a player whose transfer was under consideration. At the time the man was suffering from pneumonia, and at the suggestion of the man's wife, who said that her husband would be distressed about the contemplated transfer, the doctor unwisely pretended to be deputy for his ordinary doctor. In due course the man discovered the deception, and raised an ingenious claim on the ground that the examination had been harmful to him in that he had been disturbed and his body uncovered. When it was realized that the Union was prepared to defend any form of action, however, the claim was abandoned.

Commutation of Subscriptions

At the annual meeting the president, Mr. E. L. PEARCE GOULD, mentioned among other matters the scheme, recently introduced, whereby members can commute their remaining annual subscriptions by making one payment related to the length of their previous membership. Although the scheme had been published a short time, several members had already availed themselves of it.

The President referred also to the volume of work falling upon the Council at its monthly meetings, resulting in prolonged sessions. He told the meeting how the Council had decided to establish a Council Committee, to which would be delegated all the business and routine matters, leaving the Council free to deal with live and important cases, for the conduct of which the solicitor (Mr. Hempson) is personally responsible. This alteration in the allocation of the business of the Union, dividing it between two separate bodies—the Council Committee and the Council—has resulted in the Council being able to conclude its business in the afternoon at a reasonable hour, and also enabled it to give fuller consideration to urgent affairs requiring immediate attention.

According to the *Bombay Chronicle* the Government of Bengal and the Public Health and Local Self-government Department have decided to establish a model health unit at Singur in the district of Hooghly during the current year with a staff of one medical officer of health of the status of first-class health officer, one lady doctor, four health visitors, eight midwives, four sanitary inspectors, and two clerks and menials. The average annual cost for maintaining the unit (including contingent charges) is estimated at about Rs. 30,000, towards which the Rockefeller Foundation has offered a contribution for the first five years.

Nova et Vetera

AN AMERICAN "PHYSIOLOGICAL" SOCIETY OF 1837

Those familiar with the history of the Physiological Society in this country and the jubilee of the International Congress of Physiologists this year will probably be startled by the opening sentence of an article by Dr. Hebbel E. Hoff and Professor John Fulton[1] of Yale: "A hundred years ago the first physiological society in the world was founded in Boston, under the name of 'The American Physiological Society.'" The explanation is simply that it was not on the lines of a serious scientific body of investigators. It was founded in 1837 by William Andrus Alcott, who after one year's work obtained a diploma from the Medical Institution of Yale College, was a keen educationist, and became president of the society, and by Sylvester Graham, who among other occupations had been the general agent for a temperance society, a clergyman, and a public lecturer on the "science of human life," in which he advocated abstinence from all drink except water, a vegetable diet consisting principally of bread at least twelve hours old made from scarcely ground wheat, and a cheerful atmosphere at meal times. The advertised object of the society was to acquire and diffuse a knowledge of the laws of life and of the means of promoting human health and longevity. One attempt only, and that quite abortive, was made to advance the knowledge of physiology by means of experiment. The society did not last more than three years, and half-way through its life had a membership of two hundred and fifty-one, including ninety-three women; in Alcott's words, most of the members "were more or less feeble, and a very large proportion of them were actually suffering from chronic disease when they became members of the society. Not a few joined it, indeed, as a last resort, after having tried everything else."

SALE OF A CHILD FOR DISSECTION

Under the heading "Singular Depravity," the *Annual Register* for July 27, 1838, contains a record of the following remarkable case.

> "A very singular trial took place at the Cork Assizes. A woman was found guilty of offering to sell a child (which she had for some time supported out of charity) for the avowed purpose of dissection. The medical man to whom she made the extraordinary offer arranged a second interview at which he had a policeman concealed. She entered again deliberately upon the bargain, whereupon she was taken into custody. It appears that she was perfectly sober, but she had made the unfortunate child drunk, and when it became alarmed and cried she urged the doctor to give her something at once that would settle her, telling the poor creature that the gentleman would give her something sweet. She was found guilty. Death is the penalty provided by the statute. The judge, however, held out hopes of mercy. We do not exactly see on what grounds."

The issue of the case is not recorded.

John Wolcot, the bicentenary of whose birth occurs this year, took the M.D.Aberdeen in 1767, and two years later was ordained priest. As physician in general to horse and foot in the island of Jamaica he failed to achieve success or popularity through his frank assertion that the doctor can do little more than watch Nature and give her a shove on the back if he sees her inclined to do right. Returning to England, he soon exchanged physic for poetry, writing numerous coarse satires under the name of Peter Pindar, "a distant relative of the poet of Thebes." He died in 1819.

[1] Hoff, H. E., and Fulton, J. F. (1937). "The Centenary of the first American Physiological Society, founded at Boston by William A. Allcott and Sylvester Graham." *Bull. Inst. Hist. Med.*, **5**, 687.

OPENING OF THE NEW SESSION

NEW MEDICAL SCHOOL AT ABERDEEN

ADDRESS BY LORD DAWSON OF PENN

The new Medical School at Aberdeen University was opened on September 28 by Viscount Dawson of Penn. The school is at Foresterhill, on the outskirts of the city, on the 117-acre site of the joint hospitals' scheme, where the Royal Infirmary, the Hospital for Sick Children, and the Maternity Hospital are concentrated. Lord Meston, Chancellor of the University, presided at the opening ceremony, and among others present were the Lord Provost, the Marquis of Aberdeen, Dr. Thomas Fraser, President-elect of the British Medical Association, and Dr. G. Mitchell, President of the Aberdeen Branch. Lord Meston said that four centuries of progress looked down upon their University—centuries of steady progress from mediaeval empiricism to a humane and intelligent treatment of human suffering—and yet they might be now only on the threshold of medical knowledge and surgical skill. The present ceremony was one of rededication, and their earnest prayer was that the new building would help them to serve mankind as their forefathers with dimmer lights and narrower means had striven to do.

A Wider Comprehension of Medicine

Lord Dawson began by congratulating Aberdeen on its enterprise, saying that its regional hospital scheme should be a pattern for Great Britain in the mapping of areas. The site offered an opportunity for giving reality to the wider comprehension of medicine. Curative and preventive medicine were still separated too much into compartments. They should be brought together, taught together, and practised side by side. At present preventive medicine was inadequately taught, and was nothing but a postscript to the student's career. Such a site as that at Aberdeen offered a basis for the broadening of medical education to the profit of the community. It would be easy for the city, if in its wisdom it were so minded, to erect on the site a building which would house the most important communal clinics. Thus from the very first the students would breathe the atmosphere of preventive medicine. He pointed to the value of the team work rendered possible by such a plan, and also to the economy in expenditure.

Contrasting the conditions as they existed to-day with those obtaining a few years ago, Lord Dawson said that there had been, taking the country as a whole, a gradual growth of medical and hospital services which, however individually excellent, had become a medley of separate efforts. These services fell under the headings of communal services and clinics, voluntary hospitals, and municipal hospitals. The communal services represented a fine achievement which stood to the credit of local authorities and their medical officers and conferred substantial benefits on the common health. Their isolation and divorcement from the general body of doctors in the district was a disadvantage. They needed to be brought into the texture of medical practice. It was useless to expect the general practitioner to think in terms of constructive health unless the clinics and similar services were open to him.

With regard to the voluntary hospitals, these were living societies which had grown up with the British people. Provided the "dead wood" was periodically cut out, to allow them to languish for want of material support or to let them and all they stood for die by absorption into local authorities would be alien to our genius for social evolution and a damage to our national well-being. The faults of the voluntary hospitals in recent days had been their slowness to widen their horizon so as to include preventive medicine and its ideals. Nor could they stand as disconnected institutions; they must play their part in a comprehensive scheme of medical services. It could not even be claimed that the possession of teaching schools conferred the right to exclusiveness, for the function of teaching had been extended to the municipal hospitals and clinics.

The municipal hospitals had come into existence during the last eight years, were steadily growing in numbers and importance, and were serving the community well. But their existence had intensified the necessity for co-operation. With voluntary and municipal hospitals working side by side, it meant that there were two sets of hospitals and two sets of doctors in the same community, and confusion and conflict must result.

The remedy was suggested by that enterprise at Foresterhill. There the communal services would soon be represented by the ante-natal clinic, and, he hoped, a municipal wing to the maternity hospital. An orthopaedic service run jointly by the city and the university would be very desirable; and thus the scheme would grow. Here was a medical college fully equipped for the teaching of the sciences basic to the art of medicine, and an assemblage of special hospitals gathered round the Royal Infirmary. What finer opportunity for clinical training could there be?

Lord Dawson concluded with some remarks on the duty of leadership by medicine in regard to improvement of the human stock. The smaller the birth rate the more it was necessary to select for quality if the race was not to deteriorate.

On the proposition of Principal W. Hamilton Fyfe, seconded by Professor David Campbell, a vote of thanks was accorded to Lord Dawson for his address.

WESTMINSTER HOSPITAL

DR. HUTCHISON ON THE MEDICAL CAREER

The inaugural address at Westminster Hospital Medical School was given (for the first time in the handsome new building in Horseferry Road) on October 3 by Dr. Robert Hutchison, P.R.C.P. He compared the medical career to a race, and as one who had been over the course, offered some advice on the points where new entrants might "take a toss."

The reasons for entering upon a medical career, Dr. Hutchison said, were various, but whatever they were in the case of the young fellows before him, he congratulated them on their choice. He did so on the mundane grounds that medicine was an interesting, intriguing, even amusing occupation, in which, although with all its labours and languors they might often know fatigue, they did at least escape boredom. It also gave opportunity for the exercise of all one's powers, physical, mental, and moral, and offered an admirable field for the study of human nature in the raw. Further, the prizes in the race were quite substantial. On the whole, doctors were well paid, and they had this further advantage, that their skill, once acquired, was marketable all over the world. Some of them, starting the race, might be dismayed by the number of competitors. When he himself started half a century ago there were 400 men in his year at Edinburgh. Large though the number of entrants had been in recent years, saturation point did not seem to have been reached, and the scope and amount of medical work were always increasing. Dr. Inge had said that, though democracy might starve the clergy and practitioners of the arts, it would always demand doctors.

Handicaps and Hurdles

This medical "race" was a handicap. Some carried weight all through the course because of poor health, lack of intelligence, inborn laziness, shyness, or a bad manner. Others might be burdened by poverty. Perhaps that was not a burden, but a spur. Poverty was the only advantage which a rich parent could not give his son. The race was not really very long. Eight laps of five years each would see the end of it for most—a long time to look forward to, but short in retrospect. The first lap was a hurdle race, the hurdles being the examinations. These were inevitable, no one had suggested any substitute for them, and, rightly regarded, they added interest and even excitement to the race. The business of the student was so to run as to take them in his stride, and this he could do easily enough if he went steadily on, not in a succession of spurts.

Dr. Hutchison refused to diverge into a discussion of "that boring subject" medical education, but if he himself had any guiding principle in teaching the medical art it was summed up in the saying, "You can't have the terriers too soon at the rats"—in other words, get as early into contact with patients as possible. None the less, teaching was of importance, and considering that members of hospital staffs were appointed chiefly for professional and not pedagogic skill, it was surprising that on the whole it was so good.

Short Cuts

He deprecated the shirking of the last hurdle or two by being content with a simple qualification to practise instead of going on to a degree. He knew the reasons commonly advanced for the short cut. It was praiseworthy of a young man to desire not to be a charge on his parents for longer than he could help, but he thought it mistaken. A parent who had maintained his son to the age of 23 could surely continue doing so to the age of 23½. To suppose otherwise was to believe him capable of "swallowing the cow and choking on the tail." And the public liked "the good old M.D."

Many blind alleys awaited the young graduate—"research" posts of one kind or another, and small institutional jobs. He advised them to shun the lure of the laboratory unless they felt the curiosity and restlessness of the born researcher. Another danger against which he felt it useless to warn them, and yet warn them he must, was the premature engagement. He knew the sentimental argument—"someone to work for," and so on—but at this stage of the race he travelled fastest who travelled alone. Here "a young man married was a young man marred." As Osler used to say, they must learn to keep their emotions in cold storage.

Having escaped these and other hazards, the newly qualified practitioner had to choose his line of country, and, as the German proverb said, "*Wahl macht Qual*" (choice is torture). It was as well to have a look round first and get experience by holding resident appointments, but such posts should not be held for too long. "Don't become an appointments addict." In the house of medicine there were many mansions, but the majority, he supposed, would run the race in general practice. The general practitioner was the soldier in the front line, withstanding, often single-handed, the first assault of disease. He was all the more to be envied on that account. "A man in a good country practice particularly is a real doctor, not a mere sorting machine for consultants or hospitals, and is probably living as full, useful, and happy a life as our profession offers."

Dr. Hutchison put in a word of warning about the quack—the man who got on to the course without having first jumped the hurdles. They might say to such, as Christian said to Formalist and Hypocrisy, who came from the land of Vainglory, "You walk by the rude working of your fancies." The quack should never be regarded as a real competitor, or his methods be imitated. He might beat the qualified man sometimes in treatment, for patients still liked magic, but in matters of diagnosis the qualified man would always leave the quack standing.

The Winning Post

What made for success in the race? Not knowledge or manners, for a doctor might achieve a large practice without either! The French had a saying, "*Un peu de savoir, beaucoup de savoir faire, et assez de faire savoir*" (which he interpreted as a little knowledge, much tact, and a fair amount of advertisement). It sounded cynical, but it contained some truth. Possibly the power of inspiring confidence was the one thing needful. Some estimated success in terms of money, and it was foolish to say that that did not count. Some thought honours to be the hall-mark, but these were of little value unless bestowed by one's competitors. Perhaps Johnson was right when he said that "happiness at home" was the ultimate object of all ambition. So far as practice was concerned, that man had succeeded who had gained both the affection of his patients and the esteem of his colleagues. A friend of his, a suburban doctor, fell grievously ill and complete quiet was necessary. As soon as this was known his patients organized amongst themselves a rota of traffic controllers who, taking turns day and night, diverted all vehicles in the neighbourhood of his house for more than a week. He died before his time, but to have inspired such devotion was to have succeeded triumphantly.

But this was, after all, a race in which there were many kinds of success and no one winner, and perhaps it was not so much where one came in as how one ran that mattered.

> "They win who never near the goal,
> They run who halt on maimèd feet.
> Art has its martyrs like the soul—
> Its victors in defeat."

After Sir STANLEY WOODWARK had moved and Dr. PULVERTAFT had seconded a vote of thanks to the orator, a report upon the progress of the school was given by the Dean, Dr. ADOLPHE ABRAHAMS. He referred to the building of the new Westminster Hospital. It might seem, he said, that the new surroundings were out of all proportion to the demands. Though the school was several times larger than in its old premises in Caxton Street, the number of students must be limited to a rigid maximum. Overcrowding did not occur at Westminster and never would occur.

ROYAL DENTAL HOSPITAL SCHOOL

MR. EASON'S ADDRESS

At the annual prize distribution of the Royal Dental Hospital (London) School of Dental Surgery on October 4 Mr. H. L. EASON, M.S., F.R.C.S., Principal of the University of London, gave an address on dental education and practice.

Mr. Eason pointed out that dentistry is essentially a technical profession, that what the public demands of it is expert technique and mechanical and professional skill. In this respect it differed from medicine but resembled surgery. In choosing a surgeon, a patient—especially if himself a doctor—wanted to be assured that the surgeon was an expert in the technique of the operation to be performed, and he was comparatively unaffected by any consideration as to whether the surgeon was distinguished in writing, teaching, or research. All he wanted to know was whether the operation could be performed skilfully, rapidly, and successfully. The same sort of question arose in dentistry. The dentist would make his living by his manual dexterity. At the same time he owed it to himself and to his profession to keep abreast of all advances in the knowledge of his subject and to maintain the academic ideal. The aim of dental education was to give to every

dental practitioner such a basic training in the elementary sciences and in the main elements of medicine, surgery, and pathology that he would be able to recognize from what affection the patient was suffering, also to recognize whether it was necessary or desirable for him to perform any operation within his province, and, finally, to know what to do and how to do it. The first two requisites would depend upon the thoroughness of his general education; the third upon his technical training and skill.

Should Every Dentist have a Medical Qualification?

Desirable as it was that every dentist should have a medical qualification and be a specialist in the same sense as an ophthalmologist, Mr. Eason said that this was impracticable at present. The number of dentists required for the service of the public was so great and the combined course of study for a medical and dental qualification so long and expensive that it would be hardly possible to find an adequate number of students with the necessary time and money. To the further question, whether it was desirable that every dentist should have a university degree in dentistry, he answered "Yes." The reason why so few students, in dentistry as in medicine, took a university degree as compared with the number taking the qualification of the licensing bodies was twofold, professional and economic—the longer and harder course of study for a degree, and the need for earning a living as soon as possible. But it would be found in practice that if the course for the degree were entered upon at the beginning of the student's dental career, it would not require more than ordinary energy and determination to get the distinction. Mr. Eason was referring in particular to the course of study for the B.D.S. of the University of London.

He went on to emphasize the need for postgraduate study. "Every self-respecting dentist should make an effort to take a course of postgraduate instruction at regular intervals throughout his professional life." He also paid a tribute to the dental surgeons who, during the last forty years or so, had done so much to raise the standard of dental education. It must be remembered that in dentistry there were practically no consultants; they were all practitioners, and the better a dental surgeon taught and the more time he devoted to teaching, the less time he had for his own practice and the more competitors he created. In medicine and surgery, on the other hand, the man who got a post on the staff of a teaching hospital and became a consultant got not only an acknowledged status in his profession but reaped a material profit. His students of to-day provided him with his living of to-morrow, and the better he taught the greater would be his reward.

Mr. Eason concluded with some reference to the work of the Dental Board in respect of education and discipline. As to the future, he expressed himself uncertain whether the numbers entering the dental profession were sufficient to provide for the growing needs of an increasing population or for the inevitable wastage from the *Register*. This latter would rapidly increase during the next twenty or thirty years, for of the 14,000 dentists on the *Register* no fewer than 40 per cent. were "Dentists 1921" who would not be replaced. It seemed clear, therefore, that there was a good prospect of a successful career for all students studying dentistry at the present time.

A. R. Lozano (*Rinascenza med.*, 1938, **15**, 548) reports that among 1,752 infants under 1 year admitted to the Municipal Institute in Madrid there were 155 subjects of habitual vomiting, of whom twenty-seven had undoubted or very probable and ten probable syphilis. As, however, the proportion of cases of congenital syphilis in subjects of habitual vomiting is not higher than 25 per cent., syphilis cannot be regarded as the only or as the most frequent cause of this condition.

NEW INSTITUTE OF MEDICINE AT GLASGOW

THE GARDINER GIFT

With the opening on September 28 of the new Gardiner Institute of Medicine a fresh chapter has begun in the history of medicine at Glasgow. As Professor T. R. Elliott said at the opening ceremony, no medical school could retain its greatness unless, in addition to the duty of training practitioners, it sought also "to nourish those who had the zest for research in medical science." Sir Daniel Stevenson, Chancellor of the University, who presided at the ceremony, said that Sir Frederick Gardiner and his brother, Mr. W. G. Gardiner, were great benefactors of Glasgow University, especially on the medical side, and when new accommodation for the department of medicine was found necessary some two years ago it was the immediate and generous help of Sir Frederick and the trustees of his brother that had made the new Institute possible.

"Unit" Laboratory System

Professor J. W. McNee described the Gardiner Institute, which is fortunate in its site in that it leads off directly from the wards under the care of the Regius Professor of Medicine at the Western Infirmary, Glasgow. There are three floors. The third or top floor consists of a complete clinical unit, with separate rooms for patients, a complete dietetic kitchen (which will also be used for training dietitians), and full nursing facilities. Several laboratories are arranged at one end, but they are equipped in such a way as to allow of their easy conversion into bedrooms if necessary. The second or middle floor contains the three main laboratories, one equipped for all general methods of clinical research, one for chemical work, and one for physiological work. The laboratory equipment, supplied by Messrs. Baird and Tatlock of London, is on the new "unit" system. All the drainage, water, gas, and electrical supplies run in easily accessible but covered channels below the floor, and the laboratory benches, made up in short lengths or "units," are only lightly fixed to the walls so that they can be readily moved and connected elsewhere to the drainage and other services. The disposition of the equipment can thus be altered to suit new types of work with a minimum of expense. The ground floor is divided into two parts. On one side is the library and the professor's suite of rooms, consisting of a secretary's room, office, and combined consulting room and laboratory. There is an arrangement whereby the professor is allowed to see private patients in his own department, not only saving his time but also ensuring that he has all his equipment around him. On the other side is a small but complete out-patient department, opening on to the main out-patient entrance of the hospital. Here patients who have been resident in the main wards or in the top floor of the Institute will be "followed up" from time to time. This is an important facility allowing complete and continued survey of patients and their diseases with all equipment at hand. A small record office completes this out-patient department.

The Highest Aim of a University Faculty

In his concluding remarks Professor Elliott said that despite our skill in clinical practice and our possession of leaders of world-wide renown in physiology, pathology, and biochemistry, Scotland and England had been regrettably behind other countries in bringing these ancillary sciences into close co-operation with medicine. The practical skill of British doctors in the care of individual casualties was surpassed by none, but in the great war they had shown themselves sometimes unable to help in the general answers to new problems that arose. Since the war many young physicians and surgeons had sought a period of training abroad. They were not attracted by

the glamour of seeing the laboratories where insulin was discovered or the men who had found out the life-saving treatment of pernicious anaemia. They sought an experience of the system which had produced these wonderful gains for medicine. That system did differ from ours—though it had ceased to differ in London, Oxford, Cambridge, Edinburgh, and Aberdeen, and henceforward would cease to differ in Glasgow—in this point: that the study of medicine had been brought under the influence of that spirit of accurate scientific inquiry which was the highest aim known in a university faculty.

The opening ceremony was performed by Lady Gardiner, who wished Professor McNee and his assistants every success in the work to which they were so devoted. She said that the inspiration in making this gift was due to Sir Robert Muir, to whom her husband had always turned when he wished to do anything for the University. Among others present were the Principal of the University, Sir Hector Hetherington, Sir Robert Muir, Sir Henry Mechan, Sir George Mitchell, Dr. John Henderson, and Dr. D. J. Mackintosh.

Local News

SOUTH AFRICA

Health of Rand Miners

The report for 1937 of the Central Mining—Rand Mines Group—Health Department reflects credit on its able chief medical officer, Dr. A. J. Orenstein, and his staff. The organization now includes thirteen full-time medical officers, one part-time medical officer, and one research medical officer. During the year under review the mortality rate for diseases reached the record low level of 6.82 per 1,000. The morbidity rate for accidents due to employment, 226.18 per 1,000, is the lowest figure in the records of the group. Accidents not arising out of employment are stated to have increased again. It is hoped, however, that the removal of one of the worst slum areas, where illicit liquor selling was rife, and the building of municipal beer halls, where natives can obtain Kaffir beer, will have a beneficial effect. With regard to pneumonia, which constitutes a serious problem for the health authorities, the collected data after three years' inoculations with the "community anti-pneumonia vaccine" from the South African Institute for Medical Research were submitted for analysis to J. P. Dalton, Professor of Mathematics at the University of the Witwatersrand. His analysis, with a most interesting series of tables and graphs, is included in the report. The conclusion is obvious that, in the present state of medical knowledge, prophylactic inoculation against pneumonia cannot be relied upon to reduce markedly the incidence of the disease. Since it has been found, as a result of twenty-three years' experience, that the incidence of pneumonia almost always shows an upward trend during the cold months, the collaboration of the Government Meteorological Division was secured with a view to determining which of the meteorological phenomena, if any, played the dominant role. It appeared that pneumonia was most prevalent during the months of highest wind velocity, least rainfall, and lowest temperature. The curve of wind velocity corresponded most closely with the curve of the incidence of pneumonia. It would seem, therefore, that protection of the individual from the effects of the chilling winds is a matter of importance. To this end warm jackets have been issued to the natives, and shelters have been provided at the shaft heads on some of the mines. The report stresses the importance of these shelters as a preventive measure, and suggests that they should be provided at all shafts, that they should be adequate in size, and so constructed as to keep out wind and cold effectively.

ENGLAND AND WALES

Leeds Medical School: Retirement of Vice-Chancellor

Sir James Baillie, who has been Vice-Chancellor of Leeds University since 1924—a post to which he came from the professorship of moral philosophy at Aberdeen—retired at the end of September, and at the graduation ceremony held in the Medical School on September 23 occasion was taken to express to him in the name of the Medical Faculty the sense of gratitude he had evoked for his constant interest and help in medical education in the capital of the West Riding. In a brief farewell address Sir James Baillie offered to his colleagues on the medical staff his warm good wishes for their future and for the prosperity of the medical school. He would always retain, he said, the happiest memories of the various occasions on which he had been associated with the work of the several departments and of the loyal support which the staff had always given him in his efforts on the school's behalf. "No sphere of the University's activities has been to me of greater interest, no development in the University in recent years has afforded me greater pleasure and satisfaction than that of the Medical School; for in certain significant respects I regard the Medical Faculty as the most important and the most difficult domain of pure and applied science in the whole range of the academic curriculum." He went on to say that the high standing of the school in the eyes of the medical world was publicly acknowledged on the occasion of the centenary of the foundation in 1931. With the ampler and more appropriate accommodation secured in recent years, with the enlarged scientific staff and the greater financial resources, the school had entered upon a career of extended service to the vitally important cause of medicine. There was much still to be done, but the future, he was sure, was safe in the hands of those he was addressing to provide a new inheritance of knowledge for their successors and to give an added distinction to the University. He also expressed the hope that the growing community of interest between the members of the Medical Faculty and the whole University would be strengthened and increased as the years went on, for it was one and the same spirit of knowledge animating the whole life of the University which was the inspiration of every part. The Dean of the Faculty (Mr. Harold Collinson) expressed the general regret at Sir James Baillie's departure. By his retirement he said that the University lost the services of a man who had devoted himself heart and soul to the furtherance of its interests, the increase of its activities, and the cause of University education in the North of England. During his reign as Vice-Chancellor the development of the University had been phenomenal. In the department of medicine he had invariably encouraged and supported any suggestion for improvements in teaching and facilities for research, and in certain instances had initiated them himself. Any scheme suggested by the department had always been received by him in a sympathetic and understanding manner, and his wise counsels had been of the utmost assistance. As the head of the University in the wider field of public life, his dignity and eloquence had everywhere maintained and enhanced its prestige and influence.

King Edward VII Welsh National Memorial

The opening and dedication of the Hall of Nations at Cathays Park, the civic centre of Cardiff, will take place on November 23. The hall has been built by Lord Davies at a cost of £62,000, and apart from its work in connexion with the League of Nations Union will become the headquarters of the King Edward VII Welsh National Memorial Association, the organization which has done such valuable work in Wales in the prevention and treatment of tuberculosis, and of which Lord Davies is president. It will be remembered that Lord (then Mr. David) Davies and his sisters were responsible for founding this association in 1910. Following the Insurance Act of 1911 the functions of the association were extended to

include the administration of sanatorium benefit, then in 1921 the seventeen county and county borough councils of Wales delegated to the Memorial Association their obligations under the Public Health (Tuberculosis) Act of 1921, so that now, while the Association retains its voluntary character, it has become a semi-public service representing all the contributory authorities in the Principality. So comprehensive is its machinery that with the numerous hospitals, sanatoria, and clinics administered by it, maintenance expenditure alone amounts to nearly £300,000 a year.

Chadwick Lectures

The following Chadwick Public Lectures have been arranged on Tuesdays and Thursdays at 5.30 p.m.: October 11, at Niblett Hall, 3, King's Bench Walk North, Inner Temple, E.C., Mr. Roland Burrows, K.C., "The Development of Public Health Law during the Past Fifty Years"; October 27, at the Royal Sanitary Institute, 90, Buckingham Palace Road, S.W., Dr. Norman Macfadyen, "The Evils of the Congestion of Population and the Way Out"; November 8, at the Royal Society of Tropical Medicine and Hygiene, 26, Portland Place, W., Sir Stanley Woodwark, "The Rise and Fall of Certain Diseases Concurrent with the Progress of Sanitation and Hygiene"; November 24, at the Royal Institute of British Architects, 66, Portland Place, W., Malcolm Morris Memorial Lecture by Mr. W. W. Wakefield, "Playing Fields and the National Fitness Movement"; December 13, at the London School of Hygiene and Tropical Medicine, Keppel Street, Gower Street, W.C., Dr. Leonard Colebrook, "The Control of Puerperal Fever."

Correspondence

Medical Man-power in War

Sir,—The authorities have drawn up various schemes for utilizing the services of the medical profession in time of war. While I appreciate the good points of these schemes, and have no wish to be unduly critical, yet such schemes are drawn up largely as the result of experience of the last war and do not provide for certain obvious differences in modern warfare. I would therefore invite attention to the following points:

1. Assuming that no expeditionary force is dispatched, at any rate to begin with, the Territorial base hospitals will be standing idle if only used for military wounded. Yet these hospitals will be staffed by men receiving pay and in many cases busily employed in private practice.

2. In London and similar places there may be heavy civilian casualties as the result of air raids—which were only in their elementary stages in the last war. The voluntary hospitals will be flooded with such cases. If the honorary staff deal with these cases in a really conscientious manner they will, immediately after an air raid, have little time for their private practices. Are they to carry out this work on an eleemosynary basis? If so, it seems rather hard on these honorary staffs, especially in view of 1.

3. In areas not actually raided but receiving the evacuated sick of London a similar state of affairs to 2 will exist.

4. It is hoped that efforts will be made to use the medical profession in an economical manner. Should Territorial divisions be mobilized and held for any time more or less idle in camps in England, I would suggest that, except for a small nucleus, the regimental medical officers and officers of field ambulances might be seconded for service in dealing with air raid casualties, or other work of national importance, rather than sitting about in camps awaiting events.

5. I would also remind readers of the gross waste of medical services in the last war in the hope that such waste may be prevented in the next. I will content myself with two examples of such waste. In the Eastbourne R.A.M.C. training centre a medical officer was employed as a riding instructor! In 1917, when there was a real dearth of doctors for dealing with civilian sick in England, I was detached from a field ambulance in France and put in charge of a laundry on the outskirts of Bethune!

I am sure that all of us are ready and willing to do our bit in a national emergency, but such eagerness would be increased and the sacrifices involved borne more cheerfully if we were convinced that the burden was evenly and sensibly distributed.—I am, etc.,

H. J. McCurrich, M.S., F.R.C.S.

Hove, Sussex, Sept. 29.

*** It will be noted that this letter was written before agreement was reached at Munich. We publish it because the plans which were then incomplete will have to be completed in case of future emergency, for reasons set out in a leading article at p. 749 and in the opening pages of this week's *Supplement*.—Ed., *B.M.J.*

Organization of Trained Nurses in Emergency

Sir,—The British Medical Association, at the request of H.M. Government, has compiled a register of doctors; and from the same source a request has been made that the College of Nursing should organize similar machinery for nurses. The object is to set up a reserve composed of State-registered and certificated nurses, having no other obligations, who would be available in time of national emergency to augment the present health services. It is felt that throughout the country there must be many who, either married or retired from active service, would be anxious to link up with some organization through which their skill could be utilized. Many hundreds of extra nurses will be required to supplement the staff of hospitals, district nursing associations, and other institutions, and I would ask every nurse coming under the categories mentioned above to get in touch immediately with the headquarters of the College of Nursing, 1A, Henrietta Place, London, W.1, or any of its local branches (lists of these may be obtained from headquarters). Nurses have ever been ready to serve their country, and I feel assured that this appeal will meet with a ready response.—I am, etc.,

Frances G. Goodall, S.R.N.,
Secretary, College of Nursing.

London, W.1, Sept. 29.

Social Pathology

Sir,—In view of the tragic happenings in the world and the series of convulsive crises through which civilization is passing, it seems strange that our profession, so used to dealing with disease both physical and mental, has no theory of the pathology of society to offer. Is it not obvious that a civilization which within these last few days has been on the verge of suicide must be in a very diseased condition? And if so, should not its malady be susceptible of scientific study, like the diseases of an organism? I hope some readers of the *Journal* will agree with me that the medical profession, above all others, is that qualified to deal with social pathology, and that it is indeed its duty to study it. Why then does it not do so? In the hope of stimulating interest in this matter I venture to advance one preliminary conclusion at which I have myself arrived.

In view of the constant accretion of social services in all countries of Western civilization, how is it that this civilization is becoming not more but less healthy, as evidenced by its recent tendency to disintegrate altogether? I suggest that in multiplying the social services we have been merely treating symptoms, and that, our attention being thereby increasingly engaged, we have been more

and more neglecting the underlying disease. In other words, civilization is breaking up precisely because it has been deserted by the "qualified practitioners" and handed over entirely to the frank and self-confessed empiricism of politics.

Do any readers agree with me that the doctors, by virtue of their peculiar experience, are the very people who should study social pathology and who would be most likely to discover its laws and so lay the foundations of rational treatment and prophylaxis? The Westminsters and Whitehalls in all countries have made a sad mess of the whole business. What about the humble general practitioner stepping in now? If this letter awakens any kind of response I should like to submit one or two further generalizations which I think might prove of use.—I am, etc.,

North Queensferry, Fife, Sept. 30. A. J. Brock.

The Prognosis of Anxiety States

Sir,—The article by Dr. Arthur Harris in the *Journal* of September 24 (p. 649) is a valuable and valiant attempt to assess the imponderable. It is valuable since many people would deny the right of medical psychology to call itself a science precisely because it does not lend itself to exact measurements, and in spite of the marked change in the attitude of the profession during the past ten years or so psychology still stands in need of all the backing it can get to win the approval of those whose good fortune it is to have to deal only with disorders which have as a basis a demonstrable lesion.

The method of grading adopted by Dr. Harris is certainly useful and practical so far as it goes, but a neurosis is such an individual condition that it is impossible to apply any general standard of measurement. It represents the reaction of the individual to his environment, and the environment is something far more subtle than the financial or family worries which Dr. Harris mentions. My own experience is leading me to the conclusion that, whereas fear is the reaction of the organism to anything which threatens its physical fitness, anxiety is the response to a threat to the integrity of the personality. There is the adolescent whose urge to fulfil himself comes up against the restrictions and taboos of family and society. There is the husband or wife who has been reduced to a cipher and robbed of all initiative through being constantly exposed to the assertiveness of the other partner. There is the girl whose devotion to a parent is robbing her of her birthright of marriage, and the married man or woman whose urge to parenthood is being thwarted by the selfish caution of the other. The prognosis of a neurosis depends primarily upon what I should call "the worth-whileness" of the patient—that is, the willingness of the patient to contribute to life—and, secondly, upon the degree to which those in close touch can be brought to co-operate. I cannot see that we shall ever be able to sum up such factors in a formula.—I am, etc.,

Birmingham, Oct. 1. R. Macdonald Ladell.

Allergy and Immunity

Sir,—In your review of the recent important researches on allergy and immunity in ocular tuberculosis carried out by the staff of the Wilmer Ophthalmological Institute (*Journal*, September 17, p. 627) you indicate the support this work lends to the contention of Rich and his associates that allergy and immunity are two distinct processes.

It is unnecessary to detail the controversies that have developed in the past in order to emphasize the sharp differentiation of current opinions into the two opposed schools—the first teaching that the allergic state is an essential part of the immunological mechanism accompanying recovery from infection, and the second which adopts the contrary view on the grounds that allergy and immunity may exist independently, and considers that their association in many natural infections is entirely fortuitous. The latter view has met with increasing acceptance during the past few years, due chiefly to the researches of Rich and his co-workers.

It is my considered belief that much of this conflict of opinion is due to a failure to realize (1) that there is more than one form of bacterial allergy, as there undoubtedly is of immunity, and that any given relation between one form of allergy and immunity does not necessarily hold for the other forms; and (2) the impropriety of attempting to formulate generalizations from the study of a restricted aspect of the subject.

Recently I have attempted to analyse the relation between immunity and allergy in rabbits with reference to the pneumococci and their products, and also to correlate my results with those of other workers (*J. Path. Bact.*, 1935, **41**, 491; ibid., 1937, **45**, 257). In brief, rabbits were treated with pneumococcal vaccines by various routes and their skin reactions to (1) SSS (specific carbohydrate), (2) NP (nucleoprotein), and (3) intact organisms, together with their serum agglutinins, anaphylactic and protective antibodies, and degree of active immunity, determined by appropriate methods. The conclusions were as follows. The three types of cutaneous allergy—namely, to SSS, NP, and intact organisms—are immunologically independent.

(1) *Allergy to the SSS* is closely related to type-specific immunity and to SSS anaphylaxis, and it was concluded that these three forms of immunological reaction are probably expressions of the same basic mechanism—namely, the union of the type-specific antigen or its haptene with the homologous antibody, and that the apparent differences are only quantitative variations of the common mechanism: "type-specific immunity" when the antibodies react *in vivo* with small amounts of antigen in the test dose of living organisms and render the latter vulnerable by the host; "anaphylaxis" when the reaction takes place between the same antibodies and the antigen haptene in the tissue cells; and "allergy" when it occurs in the skin. (2) *Allergy to NP* is dependent on the presence of circulating NP antibodies, is unrelated to type and species immunity, and is essentially an antigen-antibody reaction between the NP and its antibody. (3) *Allergy to the intact organisms* is independent of type and species immunity and is not even type or species specific, being elicited by *Streptococcus viridans*. It appears to depend on an increased reactivity of the tissue cells as opposed to an antigen-antibody reaction, and the allergic state is not capable of passive transfer to normal animals by the injection of serum from the allergic individual, in contradistinction to the states of allergy to the SSS and NP, which are capable of such transfer since they depend on the presence of antibodies of the "circulating" type.

Thus, while the deductions of the Baltimore school may afford a true representation of the problem with reference to tuberculosis, the data obtained from the study of the pneumococcus makes it clear that no broad generalization on the relation of bacterial "allergy" to "immunity" is possible in view of the existence of different forms of bacterial allergy bearing different relations to anti-bacterial immunity.—I am, etc.,

David Harley.

The Laboratories of the Inoculation Department,
St. Mary's Hospital, Sept. 20.

Academic versus Clinical Anatomy

Sir,—It seems that the tables have been turned upon the academic anatomists who are for ever hiding behind the barricade of their changing terminology. The clinician has been to blame for increasing the students' tasks by talking in pre-war terms. It comes as somewhat of a surprise to find new and revised editions of standard anatomical textbooks enlarging upon the primitive streak and yet completely ignoring the works of clinical research in the more coarse matters of anatomy. It is seven years since the Medical Research Council published the work of Dr. Ormond Beadle on the intervertebral disks. It was shown conclusively by this author, working under Professor Schmorl, that the epiphyseal plates of the vertebral bodies ossified from several peripheral centres placed in the radial ridges of the cartilage and occurring in numbers from two to seventeen according to the level of the vertebra. This is taken as a basis to the understanding of some of the diseases of the adolescent spine. Reference is made to this multicentric ossification in one standard orthopaedic textbook at least (by Mercer, 1936; Arnold). The conclusions are accepted, I believe, by the great body of orthopaedic surgeons and radiologists. In fact, in a recent edition (*Surface and Radiological Anatomy*, by Appleton, Hamilton, and Tchaperoff; Heffer, 1938) a fine radiograph of an adolescent spine is shown exhibiting these centres of ossification at the anterior edges of the epiphyses. In spite of this, the latest edition of such a famous anatomical textbook as *Gray's Anatomy* boldly states and illustrates that the plate has one centre of ossification.

Maybe this is a silly pretext for a letter, but it does show how far apart the academic and applied aspects of one subject can be divorced—further, indeed, than the mere difference of terms.—I am, etc.,

London, S.W.1, Sept. 27. D. F. Ellison Nash.

George III and his Physicians

Sir,—I was greatly interested in Dr. Walter R. Bett's notes (September 24, p. 664) on the mental illness of George III and his reference to two of the great pioneers in the more humane treatment of the insane—Pinel and W. Tuke, the latter of whom founded the York Retreat in 1796. At the moment I am writing a short history of the six medical and lay pioneers in this great work, covering the years from 1784 to 1844, years of great and tragic interest. In an excellent account of the York Retreat written by Mr. Harold Hart (at one time steward of that great institution) and edited by the present medical superintendent, Dr. Neil McLeod, mention is made of the Bristol Quaker, Dr. Edward Long Fox, who in 1795 owned a private asylum at Cleeve, near Downend, which in the next year was removed to Brislington House. He was requested to meet in consultation the physicians then attending George III with the view that His Majesty should be a resident patient at Brislington House. He declined both honours. His descendant Dr. Edward Long Fox of Clifton was a valued friend of mine through my early years of medical practice. I had been his clinical clerk when he was physician to the Royal Infirmary, Bristol, and I frequently called him into consultations during my twelve years of general practice. He was President of the British Medical Association in 1894 when the Annual Meeting was held at Bristol. He was always proud to speak to me about his ancestor of Brislington House, and delighted to inform me that he was the first medical superintendent of a private asylum to introduce religious services in accord with the Church of England for his patients.

George III's mental illness was remarkable for two reasons: one the length of his illness—fifty-two years; secondly, the very clear lucid intervals he had during those years. I fear he was subjected to unkind treatment, and history tells us that not only was he in mechanical restraint but on two occasions was knocked down "flat as a pancake" by an ill-tempered and cruel attendant. It was at this time that Phillipe Pinel in 1792, in spite of much opposition and at danger to his life, released fifty-five lunatics at the Bicêtre, Paris, from chains and manacles, many of them having been so restrained for years and lodged in dungeons without a glimpse of the blue sky or the healing rays of the sun. This great work of humanity can never be forgotten, and no one can rob Phillipe Pinel of the honour of being the first pioneer of the more humane treatment of mental diseases. His name will be ever blessed by all interested in the welfare of the insane.—I am, etc.,

Bournemouth, Sept. 26. Lionel A. Weatherly, M.D.

Sir,—May I add a few words to the interesting account given in the *Journal* of September 24 (p. 664) on the many illnesses of George III, as I have what is probably a unique contemporary document connected with Dr. Willis and his high-handed treatment of the medical men in charge of the King.

Dr. F. Willis came to Kew early in December, 1788, and obtained from the Queen permission to treat the King in the same manner as he practised on his private patients. On obtaining leave he immediately dismissed all the attendants and put in his own. He then placed a notice on the "outer door" as follows:

No one except the Pages are to be suffer'd at any time to go into his Majesty's room unless they are introduced by, or have leave from one of the Dr. Willis's.
Jan. 2. 1789.

I have a copy of this order copied by my great-great-grandfather, Dr. Henry Revell Reynolds, who was one of the King's physicians and in constant attendance. This order was copied on the back of a note that runs:

My dear Doctor,
His R.H. the P. of Wales commands me to inform you that a motion will be made in the House of Lords that the King's Physicians may be examined at the bar of the House.
yrs sincerely
Jermyn Street. G. Baker.
4 Jan. 1789.

I have little doubt that he wrote on this letter because it happened to be the only piece of paper he had with him.

In evidence before the Lords Dr. Willis tried to throw the onus of this order on the Lord Chancellor. Dr. Reynolds stated in his evidence that he saw the exclusion order on the 4th, a Sunday. "I took a copy of it," he said, though as a matter of policy he had taken no notice of it.—I am, etc.,

Oxford, Sept. 26. Bertram M. H. Rogers.

Parental Whole Blood as Measles Prophylactic

Sir,—May I endorse Dr. T. D. Culbert's recommendation (*Journal*, October 1, p. 705) to use adult whole blood in the prophylaxis of measles in preference to serum or immune globulin. I have repeatedly obtained complete protection with 15 to 20 c.cm. injected during the first week after exposure. There are no reactions. The procedure is simplified in family practice if the blood is citrated to prevent clotting. A 20 c.cm. syringe is charged with 2 c.cm. of isotonic (3.8 per cent.) sodium citrate

solution from sterile ampoule or rubber-capped bottle and then filled with parental blood. This can now be taken into another room and without haste injected into the child's buttock. Experience on large numbers is still required, and should enable us to obtain the desired grade of attenuation.—I am, etc.,

London, W.1, Oct. 1. F. E. LOEWY.

Maternity "Flying Squad"

SIR,—In the light of thirty years' experience of semi-rural practice I suggest that a maternity flying squad is unnecessary. Given really careful ante-natal work two general practitioners, if one is well experienced, can do all that may usefully be done in a cottage. Surely cases of eclampsia should always be moved, and if Caesarean section becomes unexpectedly necessary it is quicker and better to move the patient straight from ambulance to theatre. The one thing the experienced general practitioner does want is to have at immediate call a transfusion service, since excessive haemorrhage has often taken place before even he arrives.—I am, etc.,

Kington, Herefordshire, Sept. 27. G. W. DRYLAND.

Vitamin C in Milk

SIR,—In answer to Dr. J. H. Lloyd's query in the *Journal* of September 10 (p. 597), dark amber or red glass bottles would be suitable to protect vitamin C from destruction by light, but there would obviously be great economic (and aesthetic) difficulties in changing the current type of milk bottle. Amber bottles have been on the market and were disliked by the consumer. Cartons, which are unobjectionable from a bacteriological point of view when properly dealt with, are definitely better than clear glass bottles regarding the stability of vitamin C. It is, however, widely believed that at present they could not compete on a large scale with glass bottles on account of cost.—I am, etc.,

National Institute for Research in Dairying, Shinfield, Sept. 27. S. K. KON.

Ménière's Disease : Personal Experience

SIR,—A sufferer from Ménière's disease, I was interested in Dr. W. Russell Brain's paper on vertigo in your issue of September 17 (p. 605), and also the one by Dr. Wright published in the *Journal* of March 26 (p. 668), and am tempted to record a personal experience.

About eight years ago I had my first definite attack—faintness, giddiness, inability to stand, nausea, vomiting, and profuse perspiration. After a night's rest I was normal again. Thereafter I had many attacks at varying intervals of a few months to a few weeks, but gradually lessening in severity. Many of the attacks came on just as I was sitting down to a meal. One end of the table would appear to sink to the floor, always on the right side; I would grip the edge of the table and forthwith fall to the floor on the left side; then would follow the usual symptoms—faintness, perspiration, nausea, and sickness, and, after a sleep, recovery.

I must confess that I had no great faith in any medicinal treatment, and did not care to submit to any operative procedure. However, I read an article by Dr. Ramsbottom of Manchester University in vol. ii of *Modern Technique in Treatment* (1926) in which he recommended small doses of quinine with or without bromides. His prescription was: quinin. sulph. ½ grain, acid. hydrobrom. dil. 15 minims, tinct. aurant. 20 minims, water to half an ounce. I took this mixture with the addition of 7½ grains of potassium bromide twice daily for several years, and, indeed, am still taking it rather irregularly. From various sources I gathered useful hints, such as reducing fluid intake to a minimum, cutting down tobacco to one ounce a week, no alcohol except an occasional glass of sherry. I also had a carious incisor tooth and two or three roots extracted.

It is gratifying to me to find that the two doctors I have named, Dr. Wright and Dr. Brain, approve of the line of treatment I adopted, the former especially stressing the importance of looking for a septic focus.

And now the sequel. I have not had an acute attack for three years. I am quite deaf on the right side and the hearing is not too good on the left, but my general health is good.—I am, etc.,

Bootle, Liverpool, September 23. JOSEPH WALKER.

Tuberculosis Dispensaries or Chest Clinics?

SIR,—As the existence of tuberculosis dispensaries has been widespread for twenty-five years, is it not rather late to worry about the name? In so far as dispensaries have effectively carried out one of their primary functions—namely, education of the public—they ought through personal instruction and their work as treatment centres to have spread abroad two well-established facts. (1) Tuberculosis, if diagnosed reasonably early and properly treated, can frequently be arrested or cured. (2) Many persons with unsuspected chronic phthisis carry out their daily tasks more or less efficiently for years, and only break down as the result of strain or some intercurrent illness in middle life.

Where new buildings are concerned there may be something to be said for dropping the word "tuberculosis," but in the case of old-established dispensaries the arguments are less valid; the buildings are, or ought to be, known for what they are. Recently at my five dispensaries this has actually been done, and we have not so far noticed any change in the attendance or demeanour of patients.

Much depends upon the knowledge and attitude of the general practitioner. By wise and tactful handling suspects can often be induced to visit dispensaries "to make sure that they are all right," as tests and examinations are nowadays general. A matter-of-fact manner combined with a simple statement as to the present improved facilities for diagnosis and treatment can do much to allay the fears of the timid. Indeed, candour is the surest way to gain or retain confidence.—I am, etc.,

Leigh, Lancs, Oct. 1. G. JESSEL.

SIR,—Judging by the letters of Dr. G. Gregory Kayne in the *Journal* of September 17 (p. 634) and of Dr. E. P. Edmonds (October 1, p. 722), I do not think that they appreciate Dr. P. Ellman's main point sufficiently, and that is that by calling the dispensary a chest clinic more patients will be willing to attend for examination.

By this method, in my opinion, more early cases will be seen. It is much better for the patient, psychologically, to be told by his doctor that in order to complete his examination he is to be sent to the chest clinic, where he will be *x*-rayed and his sputum examined, than to tell him that he is going to a tuberculosis dispensary.

In my own practice in East Ham, where, as Dr. Ellman says, the name of chest clinic is given to the "dispensary," I have rarely had a patient refuse to attend, and my general impression is that patients are only too pleased to find that all investigations are being carried out.—I am, etc.,

London, E.6, Oct. 1. C. RUTTER.

*** This correspondence is now closed.—ED., *B.M.J.*

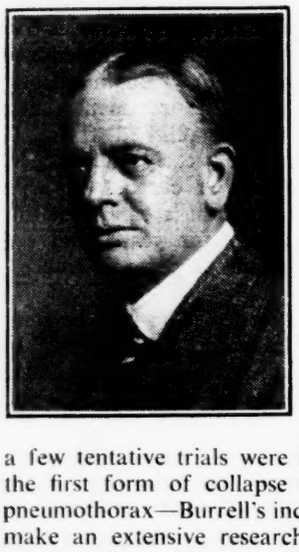
Obituary

L. S. T. BURRELL, M.D., F.R.C.P.,

Physician to the Brompton Hospital and to the Royal Free Hospital

We regret to announce the death at the age of 55 of Dr. Lancelot Stephen Topham Burrell on September 28.

Dr. Burrell was educated at Eton and Trinity College, Cambridge, and completed his medical studies at St. Thomas's Hospital. He qualified for the practice of medicine by taking the Conjoint Diploma in 1908, in the same year as he proceeded to the M.A. degree at Cambridge. Two years later he took the M.B., B.Ch., and in 1913 the M.D. He was elected Fellow of the Royal College of Physicians in 1924. After acting as medical registrar and resident assistant physician at St. Thomas's, his first important post outside his hospital was his appointment in 1913 to the staff as physician to out-patients at the Brompton Hospital. This appointment proved a most happy one for both the hospital and himself, for it gave him the opportunity for adding special experience to a general knowledge of clinical medicine. That special experience and opportunity have left their mark on the treatment of pulmonary tuberculosis. At a time when a few tentative trials were being made in this country in the first form of collapse therapy—namely, by artificial pneumothorax—Burrell's inquiring mind determined him to make an extensive research into its clinical possibilities. Starting this work soon after his election to the staff it is probable that the first induction of a pneumothorax at the hospital was done by him, and not even then without some misgivings as to its desirability being entertained by his more senior colleagues. Artificial pneumothorax treatment has progressively and ever increasingly gone ahead at the hospital from this small beginning, and special clinics for "refills" are needed daily for the out-patients requiring it while continuing, in very many cases, at their work. It would be justifiable to claim that his was recognized as the most authoritative opinion on artificial pneumothorax therapy in pulmonary tuberculosis in this and any other country. The Brompton Hospital will ever be the better for having acquired his services.



Dr. Burrell's rising reputation as a specialist in diseases of the lung led to his appointments on the medical staffs of Midhurst, Ventnor, and Benenden Sanatoria, and of Papworth Village Settlement. Then at the age of 44 he received the rare distinction of an invitation to accept the vacant post of a senior physician in one of the teaching hospitals of London and one with which he had never before been associated. His appointment of physician to the Royal Free Hospital was made in 1927, and he was its senior physician at the time of his early death. He always maintained what he regarded as a necessary balance for his special work on diseases of the lung—an associated practice in general medicine. Before going to the Royal Free he had carried this out for some years as a physician on the staff of the West London Hospital. The pressure of his work caused him to relinquish this appointment when he transferred to the Royal Free. He was also Physician to the Lord Mayor Treloar Cripples' Hospital. Burrell was Editor of the *British Journal of Tuberculosis* and a co-author of a clear and concise textbook, *Diseases of the Chest*, published in 1930 and still the best of its kind. His contributions to discussions on almost any of the pulmonary diseases were numerous, whether at a congress or at ordinary medical societies. This was perhaps the penalty of fame and a well-known kindly nature.

To his contemporaries Burrell was always considerate, courteous, and tolerant, and no junior could wish for a more friendly and helpful senior. He was incapable of attributing an unworthy motive to anyone, and was widely regarded with real affection. Lenient to an unusual degree, he could be firm when a matter of principle was involved.

In no way was he more fortunate or more to be envied than in the happiness of his family life with his wife and two daughters. He married Ruth, eldest daughter of Dr. R. Rose Clarke. It was ever a joy to his friends to see him so serenely happy in his home.

Burrell was vice-president of the Section of Tuberculosis at the Annual Meeting of the British Medical Association in Winnipeg in 1930, and again at the Centenary Meeting in London six years ago.

Sir Arthur MacNalty writes:

For nearly thirty years Lancelot Burrell and I have been friends. I first knew him as a slight, good-looking boy when I was resident medical officer at Brompton Hospital and he came there as a house-physician. Eton, Cambridge, and St. Thomas's Hospital had trained and developed his intellectual powers, and of these schools there can have been few better products. Even in those early days Lancelot Burrell was marked for high place in his chosen profession. Later on we had many contacts, both professional and social. He served with me on the Tuberculosis Committee of the Medical Research Council, where his wide clinical experience and knowledge were of great assistance. Together we planned and wrote in 1922 a report on artificial pneumothorax, published in the Medical Research Council Report Series, which I have reason to believe stimulated interest in and led to more general adoption of that form of treatment in pulmonary tuberculosis. The major share of that contribution belongs to Burrell. His writings on tuberculosis always displayed knowledge, interest, and original observation, while in consultation on a case his skill in diagnosis and selection of the best treatment for the individual patient betokened the competent physician. Burrell always worked at high pressure. He spent his great gifts freely for the good of others. He made no enemies, but countless friends. I know of a thousand acts of kindness which he did without fee or reward. He endured and faced a distressing and protracted illness in his last days with wonderful resignation and indomitable courage. Our deep sympathy goes out to his widow and family.

Dr. Halliday Sutherland writes:

The untimely death of Dr. L. S. T. Burrell is a great loss to the anti-tuberculosis campaign. Yet we should be grateful that he accomplished so much during his fifty-five years of life. As a medical student he had learnt of the limited outlook on the aetiology, prevention, and treatment of tuberculosis, best summarized in that now obsolete word "phthisis." All that has disappeared. Radiography has now its place in diagnosis: artificial pneumothorax and other surgical methods have their place in treatment. To Burrell more than to any other man in London, by

reason of his work at Brompton Hospital, should we be grateful that these methods, with the exception of major surgical operations on the chest, are now rightly regarded as coming within the province of physicians who specialize in tuberculosis. At one time there was a danger that these methods of diagnosis and of treatment might be claimed by other branches of medicine, and that the expert on tuberculosis would become an *entrepreneur*. By his colleagues on the Medical Committee of the Queen Alexandra Sanatorium Fund he is remembered as a most kindly man, very tolerant, and always willing to consider the opinions of others. Before his long and distressing illness, one of his last remarks to myself was this—"Let's meet and have a talk about tuberculin." *Ave atque Vale.*

[The photograph reproduced is by Elliot and Fry, Ltd.]

C. G. RUSS WOOD, F.R.C.S.

Consulting Ophthalmic Surgeon, Royal Salop Infirmary

We regret to announce the sudden death on September 26 at the age of 69 of Cyril George Russ Wood, O.B.E. He was the only son of Mr. Cyril J. Wood of Bath. His medical studies were pursued at Bristol University, and he obtained the M.R.C.S., L.R.C.P. in 1892 and the F.R.C.S.Eng. in 1902. At first his main interests were devoted to the study of pathology, but shortly afterwards he came under the stimulating and inspiring influence of the late Mr. F. Richardson Cross, who turned his thoughts to ophthalmology and led to his appointments as honorary ophthalmic surgeon to Southport Infirmary and Southport Eye, Ear, and Throat Hospital. In 1900 he was appointed honorary surgeon to the Eye, Ear and Throat Hospital, Shrewsbury, and it is to his lasting credit that in the exceedingly full and busy life that followed he gained his Fellowship, though among other difficulties it involved a visit twice weekly to Birmingham University for the study of practical anatomy.

His devoted services to the hospital in Shrewsbury were the means of raising its status to a very high level, and his name soon became widely known and respected in Shropshire and Mid-Wales, not only as an ophthalmic surgeon but also as an oto-laryngologist. He added to his appointments those of honorary ophthalmic and aural surgeon to the Royal Salop Infirmary, the Shropshire Orthopaedic Hospital, Wrexham Infirmary, the Montgomery County Infirmary, and Much Wenlock and Broseley Hospitals, to all of which he held the position of honorary consulting ophthalmic surgeon at the time of his death. His connexion with the British Medical Association dates from 1892, and he was from 1900 to 1931 an active member of the Shropshire and Mid-Wales Branch, being elected president in 1925.

Since the institution of the Oxford Ophthalmological Congress in 1909 Mr. Russ Wood, as one of its founders, had always been one of its keenest and most active members. He was elected honorary secretary in 1928 and became Master in 1935. He served as president of the Midland Ophthalmological Society, being elected to deliver the Middlemore Lecture in 1927, and he was also a member of the general committee of the *British Journal of Ophthalmology*. On his retirement from practice in Shrewsbury in 1931 he was elected assistant surgeon and pathologist to the Oxford Eye Hospital, and later consulting surgeon, while at the same time he became lecturer in the Oxford postgraduate course in ophthalmology and examiner in ophthalmology to Queen's University, Belfast.

Mr. Russ Wood had a very wide knowledge of the literature of his subject, and his contributions, though comparatively few, were essentially practical. Outside his professional work he had many interests. In his earlier life he was a keen amateur actor, was a great walker, and was never happier than when "doing something to the car." He was a reader and student of history; his conversation was always stimulating, revealing the wide range of his knowledge. In 1898 he married Fanny Mein, daughter of Dr. Charles Steele of Clifton, and had three daughters, to whom he was not only a father but a friend. To his wife's support and devotion he freely acknowledged much of his success, and from her death in 1935 he was never quite the same man again. He will perhaps be remembered best as a great organizer, a man of enormous industry and capacity, his work being characterized by soundness and good judgment. His personality attracted a wide circle of life-long friendships and his loss will be deplored by many.

Dr. Herbert Devas Everington of Sanderstead, near Croydon, who was killed on September 23 in a motor accident at the age of 64, was a native of Dereham, Norfolk, and from Westminster School entered St. Bartholomew's Hospital, taking the English Conjoint diplomas and the M.B.Lond. in 1899. His early appointments included those of clinical assistant at St. Bartholomew's, house-surgeon at the Royal Free Hospital, and resident medical officer at the Royal Waterloo Hospital for Children and Women. During the war he served for a year as temporary lieutenant in the R.A.M.C. Dr. Everington had practised for many years at Sanderstead, and was a past-president of the Croydon Medical Society. He had been a member of the Croydon Division of the British Medical Association since 1902.

Dr. Frederick Boileau Treves, O.B.E., who died on September 30, aged 58, was the son of the late William Treves, whom he succeeded in practice at Margate, and nephew of the late Sir Frederick Treves, the eminent London surgeon. He studied medicine at Caius College, Cambridge, taking his B.A. in 1901, and at St. Thomas's Hospital. He qualified with the English Conjoint diplomas in 1906, and took the M.B., B.Ch. degrees at Cambridge in 1909, after acting as clinical assistant in the throat department at St. Thomas's and house-surgeon to the West London Hospital. At Margate Dr. Treves became honorary surgeon to the Cottage Hospital and the Victoria Home for Children, and honorary surgeon to the Royal Sea Bathing Hospital. He served with distinction during the war, and reached the rank of lieutenant-colonel commanding the South-Eastern Mounted Brigade Field Ambulance. After the armistice he became medical referee for Margate under the Ministry of Pensions. He had been a member of the British Medical Association since 1908.

We regret to announce that Dr. Herbert John Roper died from a cerebral haemorrhage while on holiday in Cornwall. Dr. Roper qualified M.R.C.S., L.R.C.P. in 1887, and he was in general practice in Leeds for forty-seven years. He studied medicine at Leeds, where he had a distinguished student career, obtaining medals in anatomy (senior and junior), materia medica, midwifery, surgery, and medicine. He won the Thorpe Prize for medicine and hygiene. During the war Roper acted as a civil surgeon to the 2nd Northern General Hospital. He was an examiner and a life member of the St. John Ambulance Association. He was a keen member of the British

Medical Association, which he joined in 1889. Throughout his life his profession came before everything else, and surgery interested him most of all branches. Although he worked hard all day he devoted a large part of every evening to keeping himself thoroughly up to date by reading the current literature and by adopting the new ideas and methods as they were suggested. An article of his entitled "Case of Haemophilia in an Infant" appeared in the *British Medical Journal* in 1893. Every patient was carefully and individually prescribed for, and "stock medicines" were unknown in his dispensary. He will be greatly missed by his colleagues and by his patients, to whom he was always a true friend and wise counsellor as well as physician.

Dr. Frank Reginald Sawdon, formerly of Buxton, died at his home in Bath on September 30, aged 59. A native of Manchester, he went from Rugby School to Owens College, Manchester, in 1895, and graduated M.B., Ch.B. in 1901, proceeding to the M.D. in 1927, with a thesis on hypoglandular arthritis in its relation to the menopause. After qualifying he was house-surgeon to the Rotherham Hospital and then settled in practice at Buxton, where he held several appointments, including that of honorary physician to the Devonshire Hospital. Dr. Sawdon held a temporary commission during the war and was awarded the M.B.E. and the Médaille du Roi Albert. He had been a member of the British Medical Association for the past thirty-four years.

The following well-known foreign medical men have recently died: Dr. Frederick Peterson, professor of psychiatry, Columbia University, and past-president of the American Neurological Association, aged 79; Dr. Alfonso de Vestea, for thirty-eight years professor of hygiene at Pisa; Dr. O. Crouzon, member of the Académie de Médecine, professor of medico-social assistance in the Paris Faculty and physician to La Salpêtrière; and Dr. Casimir Dabrowski of Warsaw, an authority on tuberculosis, aged 52.

The Services

DEATHS IN THE SERVICES

Lieutenant-Colonel Thomas Richard Mulroney, Bengal Medical Service (ret.), died at Newquay on September 29, aged 85. He was born on June 23, 1853, the son of Thomas Mulroney of the Bombay Sub-Medical Department, and was educated at the Grant Medical College, Bombay. He entered the Bombay Indian Medical Department as assistant apothecary on September 27, 1873, and served in that department for seven years, resigning on March 30, 1880. He went with the Indian contingent sent by Lord Beaconsfield to the Mediterranean in 1877, and while stationed at Malta took the opportunity of studying at the University there, and graduated M.D., C.M.Malta in 1879. He took the L.R.C.P. and S.Ed. in 1879, the M.R.C.S.Eng. in 1880, and twenty years later the F.R.C.S. in 1900. He entered the Indian Medical Service as surgeon on March 31, 1880, became lieutenant-colonel after twenty years' service, and retired on August 13, 1909. After the usual period of military duty the rest of his service was passed in civil employ in the Punjab, where he was for long civil surgeon of Amritsar. He had been a member of the British Medical Association for twenty-four years.

Captain Gilbert Capel Hall, Madras Medical Service (ret.), died at Worthing on September 25, aged 75. He was born in London on July 27, 1863, the son of William Champain Hall, and was educated at Birmingham. He took the L.S.A. in 1884 and the M.R.C.S.Eng. in 1885. He entered the Indian Medical Service as surgeon on September 20, 1886, was placed on temporary half-pay on account of ill health on March 12, 1896, and was invalided out of the Service on March 12, 1898. He served in the Chin-Lushai campaign in 1890 on the North-East Frontier of India, receiving the medal. He rejoined for service in the war of 1914–18, was appointed captain in the Medical Branch of the Royal Air Force on November 4, 1918, and transferred to the unemployed list on May 11, 1920.

Universities and Colleges

UNIVERSITY OF CAMBRIDGE

At a Congregation of the Senate on October 1 the Vice-Chancellor, Professor H. R. Dean, M.D., Master of Trinity Hall, reviewing the past academic year, touched on the need of the University for more lecture rooms and laboratories, and for additional funds. He said that the largest of the new laboratories was that of the Department of Anatomy. The rapid growth of knowledge, particularly in the natural sciences, the increasing tendency to specialization, the consequent demand for new departments and subdepartments with specialized workers and equipment, the very large number of students, especially in the Faculties of Medicine and Engineering, and the growing number of research workers in all the laboratories must lead to greatly increased expense. Advancing knowledge and the change of outlook required new professorships and new departments, with the provision of facilities for research and teaching in new subjects. But apart from the development of subjects new to the University there was need for expansion and for change in the existing faculties and departments. In some departments the number of students had grown so much that overcrowding had become a very serious problem; lecture rooms and laboratories could not accommodate all who wished to attend. In many departments the number of undergraduates had outgrown the capacity of the teaching staff, and there was grave risk not only that the standard of teaching might fall but that overworked teachers might not find proper time for the advancement of their subject by research. Increased expenditure appeared to be inevitable unless the University adopted the policy of limiting the number of students in the more crowded departments.

UNIVERSITY OF LONDON

A course of five lectures on "The Position of Viruses in the Organic World" will be given by Professor F. W. Twort, F.R.S., on December 1, 2, 5, 8, and 9, at 5 p.m. The first four lectures will be given at the London School of Hygiene and Tropical Medicine, Keppel Street, Gower Street, W.C., and the fifth lecture, with demonstration, at the Brown Animal Sanatory Institution, 149, Wandsworth Road, S.W.

London Hospital Medical College

Schorstein Lecture

The Schorstein Memorial Lecture will be delivered by Dr. Leonard G. Parsons, professor of diseases of children in the University of Birmingham, in the anatomy theatre of the London Hospital Medical College on Thursday, October 13, at 4.30 p.m. His subject is "The Haemolytic Anaemias of Childhood." Members of the medical profession are invited to attend.

Hutchinson Triennial Prize

The subject for the next Hutchinson Triennial Prize is "Bronchiectasis," and dissertations must be delivered at the London Hospital by October 31, 1941. Full conditions may be obtained on application to the dean of the London Hospital Medical College.

King's College

Lectures

A special University lecture on "Some Aspects of Blood Pressure Regulation and Experimental Arterial Hypertension" will be given at King's College, Strand, W.C., by Dr. C. Heymans, professor of pharmacology in the University of Ghent, on Friday, October 14, at 5.30 p.m., with Professor R. J. S. McDowall in the chair. The lecture, which will be illustrated by lantern slides, is addressed to students of the University and to others interested in the subject. Admission is free without ticket.

A lecture on "The Formation of the Pronephros and its Causes" will be given by Dr. A. Dalcq, professor of anatomy in the Université Libre de Bruxelles, at King's College on Tuesday, November 8, at 5.30 p.m., with Professor T. Nicol in the chair.

University College Hospital Medical School

The address by Sir StClair Thomson on "Lister at University College and Hospital," announced in this column in our issue of September 24 to be given on October 4, has been postponed until Tuesday, October 11, at 4 p.m.

Medical Notes in Parliament

Foreign Policy Debate: Air Raid Precautions

During the debate on the foreign situation in the House of Commons on October 4 Mr. ATTLEE urged that time should be given to discuss the whole question of air raid precautions, the extent to which they had been effective, and the extent to which the provisions were going to be continued. This question, he said, was interesting the mind of the country and the minds of members of the House, and he could see no reason why the House should propose to adjourn on Thursday, October 6. Mr. CHAMBERLAIN said he would consider what Mr. Attlee had said, and he would make a statement in the course of the day.

Mr. H. MORRISON said he did not think there was reason for general satisfaction with regard to the preparations for A.R.P. which were made by the Government.

Later Mr. CHAMBERLAIN said the debate on foreign policy would conclude on October 6. It was proposed that the House should then adjourn until November 1. Power would be given to the Speaker to call the House together at an earlier date if the public interest so required.

Mr. ATTLEE said that the Labour Party did not acquiesce in the adjournment of the House till November 1.

Sir THOMAS INSKIP said on October 4 that the test of last week had revealed grave defects in the national defence arrangements, and that both civil and military provisions would be improved. Steps had already been taken for that purpose.

Medical News

Queen Mary will open on October 21 the new Albert Dock Hospital established by the Seamen's Hospital Society. It contains sixty-four beds and a model fracture clinic and rehabilitation centre.

The Voluntary Hospitals Emergency Bed Service announces that a full twenty-four hours service, every day in the year, will be in operation as from October 8. Further particulars can be obtained from the secretary, 10, Old Jewry, E.C.2, telephone number Metropolitan 8781.

Lord Horder will deliver the inaugural address before the Edinburgh Philosophical Institution on Tuesday, October 11. His subject is "Medicine and Religion."

Under the auspices of the British Homoeopathic Association Dr. F. H. Bodman will give a lecture on "The Present-day Confirmation of the Homoeopathic Approach" in the Barnes Hall of the Royal Society of Medicine, 1, Wimpole Street, W., on Thursday, October 13, at 5 p.m., with Sir John Weir in the chair.

The presidential address to the British Institute of Philosophy, entitled "Twenty Years After—A Survey," will be given by Viscount Samuel at University College, Gower Street, London, W.C., on Tuesday, October 11. Chairman, Dr. L. P. Jacks, D.Litt. Cards of admission can be obtained from the Director of Studies at University Hall, 14, Gordon Square, W.C.1.

A meeting of the Society for the Study of Inebriety will be held at Friends House, Euston Road, N.W., on Tuesday, October 11, at 4 p.m., when Professor Edward Mapother will give the seventeenth Norman Kerr Memorial Lecture on "The Physical Basis of Alcoholic Mental Disorder."

The Minister of Health (Dr. Walter Elliot) will formally open the new laboratories of the Metropolitan Water Board at New River Head, Rosebery Avenue, E.C., on Monday, October 17, at 3 p.m.

The opening address of the new session at Guy's Hospital Medical School will be given by Sir Henry Dale, M.D., F.R.S., Director of the National Institute for Medical Research, on Friday, October 14, at 3 p.m.

The forty-fourth Congress of the Italian Society of Internal Medicine will be held in Rome under the presidency of Professor Cesare Frugoni from October 19 to 22, when the following subjects will be discussed: pathology and clinical aspects of the menopause, primary myopathies with special reference to progressive muscular dystrophy, and abdominal syndromes (in combination with the Italian Society of Surgery). Further information can be obtained from the secretary, Professor Arnaldo Pozzi, R. Clinica Medica, Rome.

The first Congress of the Societies of Endocrinology of the Little Entente will be held at Bucarest from October 23 to 26. Further information can be obtained from Professor C. I. Parhon, Splaiul Independentii III, Bucarest.

At the annual conference of the National Council of Women of Great Britain in London from October 14 to 16 a number of items on the agenda will be of interest to medical women, such as the appointment of women police surgeons, the legalization of abortion, hospital pay-beds, mental health, and the community care of epileptics. Further information can be obtained on application to the secretary, 92, Gower Street, London, W.C.1.

A course in infant hygiene will be held at the Hospice des Enfants Assistés, 71, Rue Denfert-Rochereau, Paris, XIVe, from October 10 to 28 under the direction of Professor Lereboullet and Dr. Lelong.

The Board of Control (England and Wales) (Lunacy and Mental Deficiency) changed its address on September 19, 1938, to Hobart House, Grosvenor Place, London, S.W.1. Telephone: Sloane 0828.

Sir Milsom Rees is again offering two £100 scholarships for Port Regis Preparatory School to the sons of medical men. Candidates must be under 9 years of age when the examination is held during the first week in March, 1939. Applications should be addressed to the Head Master, Port Regis, Broadstairs.

The Secretary of State for the Home Department proposes, at the expiration of forty days from September 30, to make regulations under the Factories Act, 1937, extending the provisions of Section 66 to compressed air illness. Copies of the draft regulations may be ordered through any bookseller from H.M. Stationery Office.

The editor of *Medical Life*, the only monthly journal of medical history in the English language, announces that the journal will cease publication after December.

The issue of *Bruxelles-Médical* for September 18 contains summaries of the papers read at the eleventh Congress of the International Society of Surgery, held at Brussels from September 19 to 22.

The postgraduate demonstrations arranged for the benefit of old students of the University College Hospital Medical School have been postponed for one week, until Thursday and Friday, October 13 and 14. The old students' annual dinner, to be held in the library of the Medical School, has been postponed until October 14. The annual dinner of the University College Hospital Medical Women's Association, to be held at the Langham Hotel, has been postponed until October 14. The address by Sir StClair Thomson on "Lister at University College and Hospital" has been postponed until Tuesday, October 11, at 3.15 p.m., in the lecture theatre of University College Hospital Medical School.

The tenth annual conference of the National Smoke Abatement Society at Cardiff has been postponed and will be held during November, if circumstances are then favourable.

The Health Committee of the League of Nations at a recent meeting agreed to co-operate with the Belgian Ministry of Health in making a survey of health conditions of the population and of the equipment, organization, methods and efficiency of the health services of Belgium.

On the occasion of the tenth Psychotherapeutic Congress recently held in Oxford Mr. Hugh Watts made a donation of £15,000 for the foundation of an international psychotherapeutic experimental institute.

Mr. Norman H. Davies, ambassador at large and adviser to the State Department of the United States on European affairs, has been appointed by President Roosevelt as Chairman of the American Red Cross in succession to the late Dr. Cary T. Grayson.

Dr. W. E. Thompson, the oldest doctor in the United States, celebrated his 103rd birthday at Bethel, Ohio, on July 6.

EPIDEMIOLOGICAL NOTES*

Acute Poliomyelitis

Acute poliomyelitis appears to be on the wane in Great Britain, although a dramatic fall in incidence has not occurred nor is to be expected. In England and Wales 60 cases were notified during the week under review compared with 76 in the previous week, while the numbers for London and Scotland were 3 (7) and 10 (11), respectively. More than one case was reported from the following towns: Edinburgh 6, Wembley 3, and 2 each from Braintree (rural), Edmonton, Glasgow, Hull, Manchester, Nottingham, Reading, Saltburn and Marske, and York. That the disease remains endemic in Essex and the adjoining parts of Suffolk is shown by the occurrence of 1 case each in Braintree and Bocking, Chelmsford, Dunmow, Hadleigh, Halstead, Sudbury, Melford. The 3 London cases occurred in Deptford, Islington, and Fulham.

In Germany during the week ended September 10, 419 cases were recorded compared with 365 in the previous week, chiefly in Cologne district, 97 (112), Düsseldorf 27 (24), Wiesbaden district 29 (23), Württemberg 72 (47), Bavaria 33 (31), Saxony 33 (24), 14 in Berlin and 13 in Baden. During the first thirty-six weeks of the year 2,428 cases were recorded for the whole country, compared with 1,767 during the corresponding period of 1937. In the week under review 39 cases were reported in Austria, of which 5 were in Vienna. The week ended September 17 saw a decline of the Holland epidemic, 54 compared with 58, of which 26 occurred in the Province of South Holland (Rotterdam 7, The Hague 6, and Waddinxveen district 4). During August 61 cases of paralytic poliomyelitis were notified in Denmark compared with 15 in July, while in Sweden the number rose from 56 to 268. Of the 167 cases recorded in the latter country between August 16 and 31 (59 of which were non-paralytic), 63 were in the rural regions of Jämtlands Province and 32 in the rural regions of Kristianstads Province.

Typhoid Fever

No fresh outbreaks of typhoid fever have been recorded during the week, and outbreaks already in progress have all declined to 1 or 2 cases. More than one case was reported from Coventry 3, and 2 each from Berkhamsted, Enniscorthy (Eire), Farnworth, Glasgow, Liverpool, and London (Lambeth and Southwark). No deaths were reported from any of the principal towns specified in the table.

Primary and Influenzal Pneumonia

An increase, amounting to nearly 25 per cent. over the numbers notified in the previous week, in the incidence of pneumonia suggests that further increases may be expected in the coming weeks. The figure of 540 is greater than that for the corresponding week last year and the median value for the last nine years. London has shared in the rise, but to a less extent. Of the 23 deaths from influenza in the 126 Great Towns, there were 4 in Birmingham, 3 in London, and 2 in Liverpool.

* Except where otherwise mentioned, figures in parentheses refer to the week preceding the one under review.

Diphtheria and Scarlet Fever

The rise in the notifications of diphtheria in England and Wales has not been maintained, the figures falling from 1,213 to 1,198 (London 159 to 152). A slight fall was recorded in N. Ireland. In Scotland and Eire, on the other hand, increases continue to be reported; the chief were in Glasgow 65 (43), Edinburgh 17 (7), Lanark 12 (8), Renfrew 11 (6), and Dublin 22 (18). Of the 23 deaths in the Great Towns 4 occurred in London, 3 in South Shields, and 2 each in Barnsley, Liverpool, and Stoke-on-Trent. Two deaths were recorded in Dublin and one each in Glasgow and Edinburgh.

Increases in the incidence of scarlet fever have to be recorded for England and Wales (in which London has shared) and Scotland. Although no large outbreaks were recorded in particular areas the notifications show that the disease is on the increase generally, rural districts being involved, in comparison to their size, almost as much as towns and urban districts. Notable increases were reported from Newport 26 (18), York 18 (4), Islington 18 (9), Leicester 5 (4), Bethnal Green 13 (7), and Southwark 11 (4). While in the majority of large towns notifications were maintained or slightly increased, they fell in Manchester 23 (37), Bristol 14 (19), Glasgow 66 (69), and Edinburgh 31 (34). During the week one death was recorded in London and in Glasgow.

Measles and Whooping-cough

Two deaths from measles (in London and Leeds) were recorded in the 126 Great Towns of England and Wales compared with 3 in the previous week. In Scotland the notifications were 18 (19), the principal centres being Dundee 4 (4), Dunfermline 4 (1), Glasgow 4 (11), and Lanark 2 (0). Of the 6 deaths from whooping-cough in the 126 Great Towns 3 were in London and 1 each in Birmingham, Tynemouth, and Swansea. In Scotland there was a small rise in notifications—125 against 117: the chief increases were noted in Glasgow 109 (94), Edinburgh 4 (2), Dundee 3 (1). Two deaths were recorded (Glasgow and Paisley).

On October 1 measles and whooping-cough were made notifiable in the administrative county of London. By this order all cases occurring in a household at an interval of two months from any previous cases must be notified to the borough medical officer of health. Cases occurring in infectious diseases hospitals are exempted from the requirement.

Cholera

The incidence of cholera in Shanghai declined during the week ended September 24 from 209 to 113, while deaths fell from 70 to 46. In Eastern Kwantung cases fell during the week ended September 10 from 1,408 (380 deaths) to 936 (225 deaths). During the week ended September 24, 4,620 cases were recorded in the Central Provinces of India compared with 5,295 in the previous week. The peak of the epidemic was between August 28 and September 3.

Plague

In India plague appears to be on the increase in the week under review: in the Central Provinces 116 (68) with 6 deaths (11) and in Madras Presidency 18 (6) with 15 deaths (6); but elsewhere decreases are reported where the disease has been present—Bombay Presidency, United Provinces, and Bihar. In Burma approximately 40 cases with 35 deaths have been recorded in each of the last four weeks.

Typhus

Recently there has been a notable decrease in typhus in Egypt, Algeria, Morocco, and Tunisia, where it is usually rife. In Italian East Africa 50 cases (including 29 at Addis Ababa, 12 in the territory of Choa, and 9 at Asmara) were reported in the period July 1 to September 14. In the U.S.A. 60 cases occurred from August 28 to September 3, the chief centres being Georgia 21 (22), Texas 16 (6), Alabama 13 (8), South Carolina 7 (9).

No. 38.

INFECTIOUS DISEASES AND VITAL STATISTICS

We print below a summary of Infectious Diseases and Vital Statistics in the British Isles during the week ended September 24, 1938.

Figures of Principal Notifiable Diseases for the week and those for the corresponding week last year, for : (a) England and Wales (London included). (b) London (administrative county). (c) Scotland. (d) Eire. (e) Northern Ireland. Median values for the last 9 years for (a) and (b).

Figures of Births and Deaths, and of Deaths recorded under each infectious disease, are for : (a) The 126 great towns (124 in 1937) in England and Wales (including London). (b) London (administrative county). (c) The 16 principal towns in Scotland. (d) The 13 principal towns in Eire. (e) The 10 principal towns in Northern Ireland.

A dash — denotes no cases ; a blank space denotes disease not notifiable or no return available.

Disease	1938					1937 (Corresponding Week)					1929-37 (Median Value Corresponding Weeks)	
	(a)	(b)	(c)	(d)	(e)	(a)	(b)	(c)	(d)	(e)	(a)	(b)
Cerebrospinal fever	18	—	12	—	1	15	2	4	—	1		
Deaths		1	1				—	1				
Diphtheria	1,198	152	201	56	25	1,320	171	191	41	32	1,222	201
Deaths	23	4	4	2	—	28	5	3	1	—		
Dysentery	27	2	30	—	—	78	13	17	2	—		
Deaths				—	—				—	—		
Encephalitis lethargica, acute	2	—	—		—	3	—	—		—		
Deaths		1					1					
Enteric (typhoid and paratyphoid) fever	27	2	3	7	1	45	7	10	6	1	72	
Deaths	—	—	—	—	—	2	—	—	—	1		
Erysipelas			72	2	6			66	13	5		
Deaths		—					2					
Infective enteritis or diarrhoea under 2 years												
Deaths	41	10	10	7	7	57	11	13	17	8		
Measles			18		—			26		8		
Deaths	2	1	—	—	—	6	—	—	—	—		
Ophthalmia neonatorum	88	4	16		4	93	9	38		—		
Deaths												
Pneumonia, influenzal‡	540	42	1		—	497	36	11	1	2	497	44
Deaths (from Influenza)	23	3	2	—	—	20	5	1	1	—		
Pneumonia, primary			134	10				144	6			
Deaths		7		7	6		10		10	6		
Polio-encephalitis, acute	3	—				2	—					
Deaths		—					—					
Poliomyelitis, acute	60	3	10	—	—	45	10	—	1	—		
Deaths		—					—					
Puerperal fever	2*	2	3	3	—	40	4	14	—	—		
Deaths		—					1†					
Puerperal pyrexia	157	21	14		1	137	21	17		6		
Deaths												
Relapsing fever	—	—			—	1	—	—		—		
Deaths												
Scarlet fever	1,768	160	373	59	73	2,121	179	509	80	66	2,029	286
Deaths	1	1	2	—	—	1	—	—	—	1		
Small-pox	—	—	—		—	—	—	—		—		
Deaths	—	—		—	—	—	—		—	—		
Typhus fever	—	—	—	—	—	—	—	—	—	—		
Deaths				—	—				—	—		
Whooping-cough			125		9			41		8		
Deaths	6	3	2	2	1	20	4	4	—	1		
Deaths (0-1 year)	269	50	69	27	20	309	46	63	39	15		
Infant mortality rate (per 1,000 live births)	45	41				52	38					
Deaths (excluding stillbirths)	4,057	781	552	174	134	3,906	762	585	186	115		
Annual death rate (per 1,000 persons living)	10.0	9.9	11.2	11.8	11.9	9.7	9.6	12.0	12.7	10.2		
Live births	6,311	1,158	847	348	235	6,460	1,264	830	336	228		
Annual rate per 1,000 persons living	15.5	14.7	17.3	23.6	20.8	16.0	15.9	17.0	22.9	20.2		
Stillbirths	284	44				214	42					
Rate per 1,000 total births (including stillborn)	43	37				32	32					

* After October 1, 1937, puerperal fever was made notifiable only in the administrative county of London.

† Death from puerperal sepsis

‡ Includes primary form in figures for England and Wales, London (administrative county), and Northern Ireland.

Letters, Notes, and Answers

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QUERIES AND ANSWERS

Treatment of Pruritus Ani

"L. A. F." writes in reply to "J. M." (*Journal*, October 1, p. 728): I myself was for long a sufferer from pruritus ani, chiefly at night. Innumerable local applications failed to give other than partial relief. Three months ago I tried careful washing every night with soap and water, both inside and outside the anus, and so far have had "peace."

"J. P." writes to suggest a trial of "proctocaine," manufactured by Allen and Hanburys Ltd. as an improvement on their preparation "A.B.A."; the active ingredients are procaine, benzyl alcohol, and butyl-*p*-aminobenzoate. Another correspondent recommends "J. M." to try "percaine oily solution" for injection and "percainal," an ointment containing 1 per cent. percaine, both of which are prepared by Ciba Limited.

LETTERS, NOTES, ETC.

Heparin

Mr. J. E. R. McDonagh, F.R.C.S., writes: Having undertaken some experiments with this substance I think the following remarks may be of some value to your readers. Heparin appears to belong to the class of substances which includes the cardiac glycosides and to be closely allied to bufotalin and the snake venoms. It is a reliable anti-coagulant, but it alters materially the chemico-physical characteristics of the protein. The preparation increases the sedimentation rate of the red blood corpuscles, which I consider to be due to its initial dehydrator action. It raises the refractive index of the serum and tends to increase the percentage of the blood sugar and the blood urea. Heparin usually increases the percentage of protein and invariably raises the viscosity of the plasma. Both the viscosity–refractive index and the viscosity–protein index are raised considerably. The ultra-microscopic picture is one I regard as indicating that the protein has been subjected to hydration, which I hold to be the second action of heparin. In my opinion most of the changes to be detected in the blood following the use of heparin are due to the hydration it makes the protein undergo. I look upon its anti-coagulant action as being due to this chemico-physical change, and explain the effect heparin has in correcting thrombosis in checking the dispersion, which, through a reversal of the two colloid phases characterizing this change under certain conditions, is responsible for the coagulation of the blood. Heparin acts in thrombosis similarly to "Sum 468" and in my experience has no advantage over the latter preparation, which has continued to give satisfactory results since I first began to use it in 1923. Heparin, owing to its powerful initial dehydrator action, might prove of greater value in dispersing protein which has reached the maximum degree of hydration in such conditions as haemophilia, Addison's anaemia, and agranulocytosis, which are some of the clinical manifestations of disease produced by this chemico-physical change.

The Nature of Viruses

Dr. W. M. Crofton writes: The learned writer of your annotation of September 24 (p. 667) states that the consideration of the true nature of viruses is of purely academic interest. I beg profoundly to differ from him. My view is that the question is of first practical therapeutic importance, and for this reason that a dead antigen of a virus is a feeble one, a live virus antigen is a powerful but dangerous one, even when protected by an accompanying dose of antiserum. This is well illustrated by the occurrence of encephalitis quite commonly after the virus prophylaxis of distemper. If it can be shown that a virus is indeed microbial in nature by the demonstration that by changing its environment from a living cellular one to one free to the air—for example, from an enclosed tissue to the surface of a mucous membrane or from a Noguchi culture to the surface of a blood-agar culture—characteristic bacilli invariably grow, and that these bacilli transmit the disease and dead antigens of them prevent and rapidly cure the disease, then it seems to me proof positive that the bacillus has grown from the virus. If in addition to this the bacillus is returned to a living cellular environment and, after incubation, that culture filtered through such an impeccable filter material as a Seitz disk, and the bacillus grown from the filtrate, it appears to me that this view is overwhelmingly proved. I have found a particular bacillus always associated with foot-and-mouth disease, having grown it from the blood, intact vesicles, and saliva, and with an antigen of it prevented and cured the disease in the field. By growing it in undiluted defibrinated cows' blood it rapidly goes into the virus form and is readily filtered through a Seitz disk, and the bacillary form recovered by growing it on unheated cows' blood agar. The virus of foot-and-mouth disease is so minute that its "vitality" has been called in question. Surely the demonstration that it develops into a bacillus must finally settle the question.

Psycho-physiological Aspect of Vertigo

Dr. A. Murdoch (Bexhill-on-Sea) writes: In considering "the psycho-physiological aspect" of vertigo Dr. W. Russell Brain (*Journal*, September 17, p. 605) writes: "These two schemata [that of the external world and that of the body], however, are far from independent of each other, since the bodily schema receives contributions from proprioceptors, such as the labyrinths, which are in part stimulated by an external force of gravity, and, on the other hand, the perception of external space includes in its raw material proprioceptor impulses." It would be interesting to know from Dr. Brain how gravity can act on the labyrinth without some activating mechanism to cause displacements of the head and so alter its position in space and relative to the rest of the body. In this way only could gravity become a force and act, and, if so, what mechanism has Nature provided to ensure the delicate movements of the head which stimulate the elements in the labyrinth to function? I suggest that the atlas and axis with their specialized ligaments and muscles—the suboccipital muscles—form a mechanism specially designed by Nature for this and other essential purposes. In a previous sentence in this address Dr. Brain says "the body is represented by a constantly changing model—a plastic schema, to use Head's 1920 phrase." Is not this a function of the labyrinth, that by registering the alterations due to the functioning of the atlanto-axial-occipital muscle mechanism the *whole* muscular system is integrated in a co-ordinated "plastic schema"—a constantly changing model? Is it not the mechanism which explains Magnus's statement regarding his decerebrate animal—"that when the head leads the body follows"?

Disclaimer

Mr. T. Pomfret Kilner, F.R.C.S., writes: I should like to disclaim all responsibility for publicity given in a London evening newspaper on September 27 to my recent visit to the third European Congress of Plastic Surgery in Milan. I gave no information to any member of the Press, nor to anyone who would pass on information to the Press, on this subject, and it is particularly annoying to me to have such incorrect statements made about my work.